VOL. 51 THIRD SERIES No. 11 SEPTEMBER 1944

JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

LONDON
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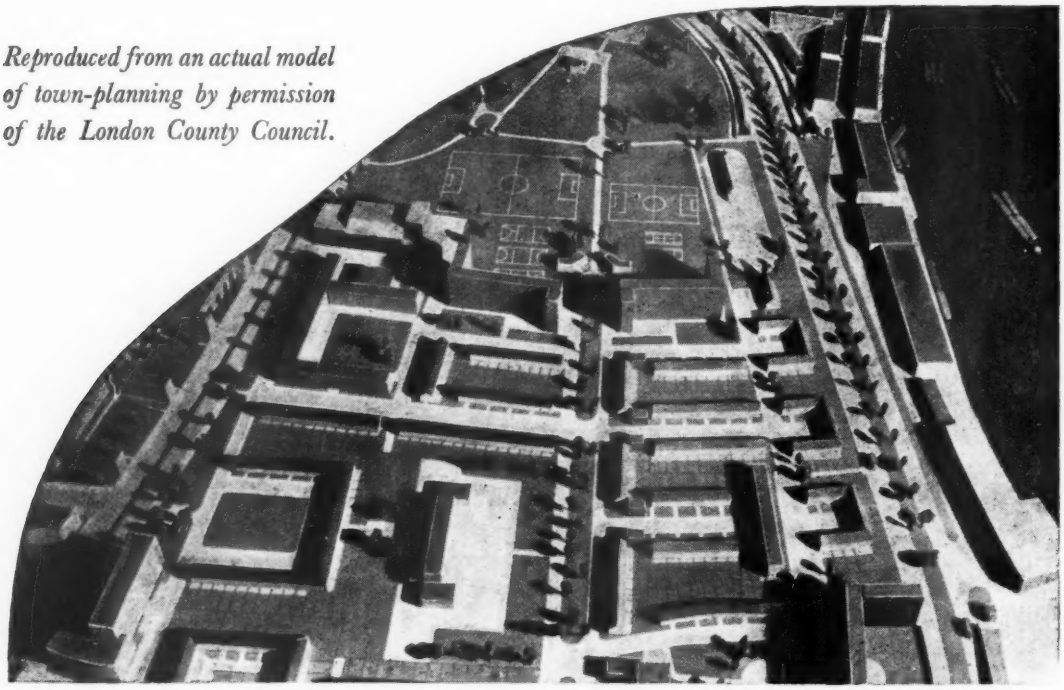

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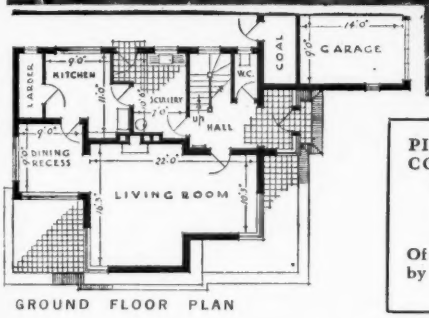

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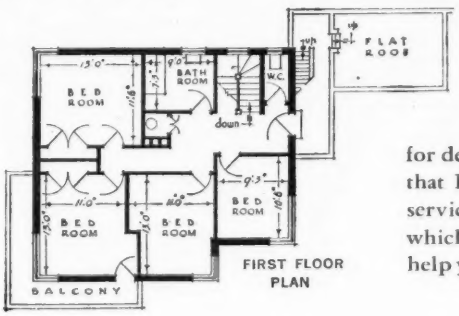

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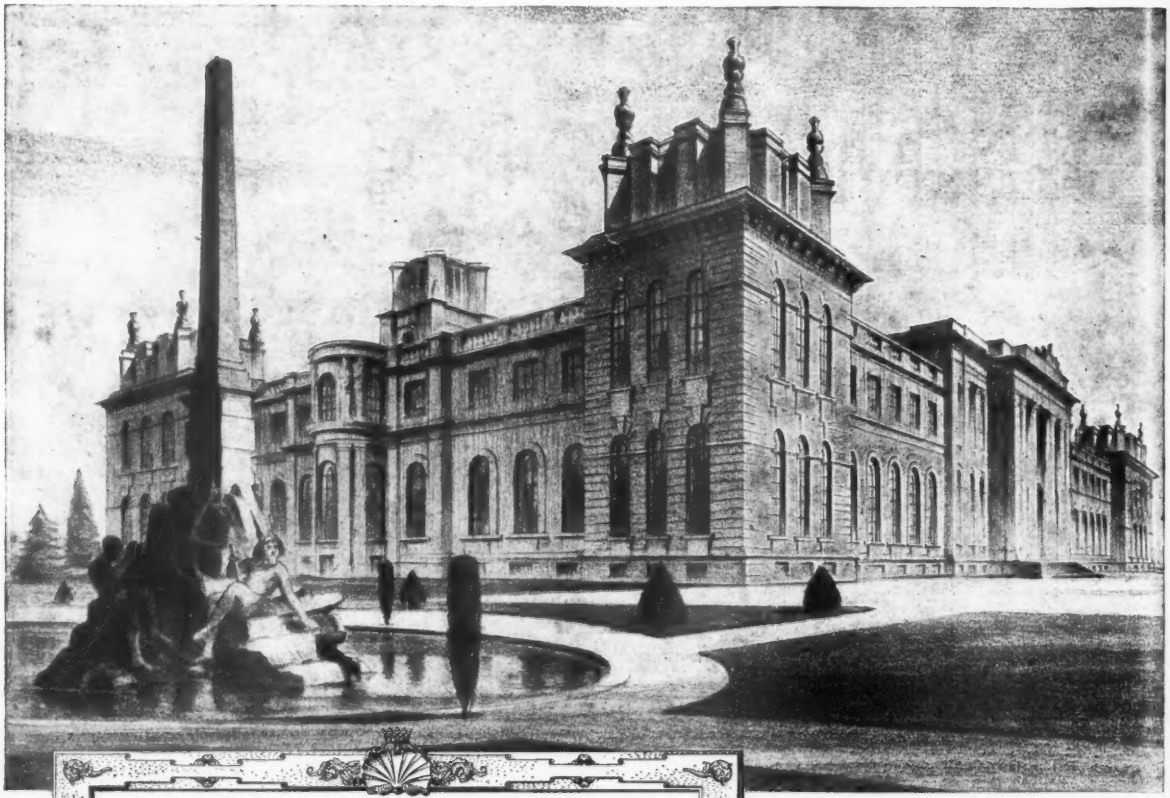

MEMORIAL OF VICTORY

Blenheim Palace, Oxfordshire: England's largest country house; designed by Sir John Vanbrugh (1664-1726) on estate presented by nation to Marlborough after famous victory at Blenheim, 1704. Vanbrugh's extremely individual style, employing Palladian, baroque and medieval motifs, has provoked severe censure and inspired warm praise. His maturest design is considered to be Seaton Delaval

YEARS of effort, peril, triumph have brought Vanbrugh's work into better perspective. With all his extravagancies, he understood better than any architect since the Roman Empire, the symbolism of military achievement; and Blenheim, in its enormous scale, its defiant gestures, its triumphant array of martial emblems, its singular blend of palace and fortress, is a supreme commemoration of Victory. He saw truly and made a house for giants and heroes . . . . . In the age of the first Churchill, victory expressed itself in building — a natural sequence, to be repeated in our own time. We hope that our national rebuilding will be as worthy of our victory . . . . . and count with confidence on playing a useful part in it.

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will once more protect the vital spots

At the moment the question of using Lead for covering domes and porticos is not likely to arise, but there are cases in both new work and repairs in which it is not permissible to use Lead even though it is the only thoroughly satisfactory material. Lead flashings, for instance, may only be used in a substance not exceeding 4 lbs. per square foot on roofs of irregular contours — in which case the flexibility of Lead is indispensable to a satisfactory job. But when it is possible to relax such restrictions, Lead will once more be freely used in all cases where permanent protection must be combined with flexibility.

For the latest details concerning the permitted use of Sheet Lead and Lead Pipe at the present time, consult your usual supplier or the revised Economy Memorandum issued by the Ministry of Works. For a summary of the best and most up-to-date methods of applying the unique properties of Lead to typical building problems, refer to the Technical Bulletins and Information Sheets issued by this Council, copies of which are available on request.

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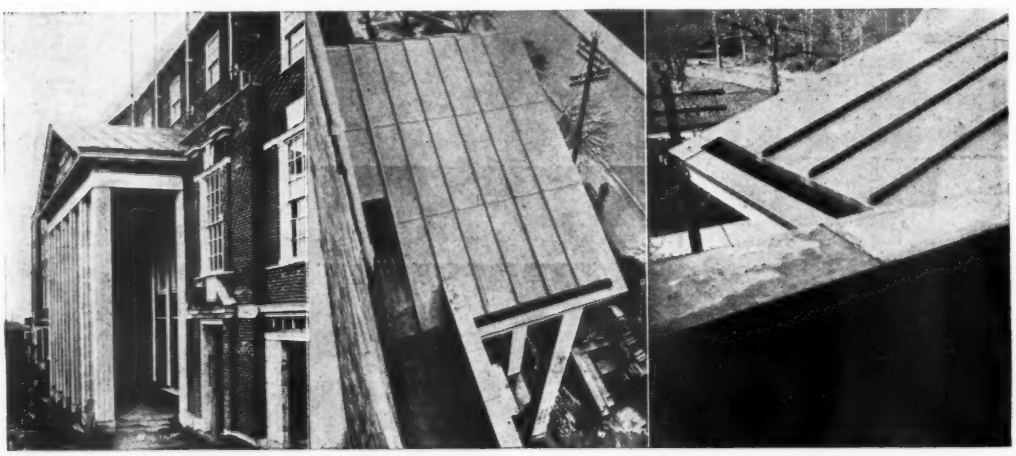


(*N.B.R.*)

The Pavilion in Russell Square, London, destroyed by a bomb. The garden was laid out, about 1810, by Humphry Repton, who may also have designed the Pavilion

JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

3rd Series **No. 11]** SEPTEMBER 1944 **[*Vol.* 51**

CONTENTS

Journal

SIR EDWIN LUTYENS' MEMORIAL

We have received the following letter from Mr. Jasper Ridley, Chairman of the Committee for the proposed memorial to Sir Edwin Lutyens.

The appeal is clearly one which needs no additional gloss in the pages of the JOURNAL of his own professional colleagues whose knowledge of the superb contributions which Lutyens made to the art of architecture is persuasion enough.

13, Mansfield Street,
London, W.1.
24 August 1944.

Dear Sir,

You will doubtless have seen the letter in "The Times" on Tuesday regarding the proposed Memorial to the late Sir Edwin Lutyens.

The Committee is naturally anxious that the appeal should have as much publicity as possible and would be grateful if you will assist them by

publishing it in the next issue of your Journal. I enclose a copy of "The Times" letter, and if you felt it suitable to add any comments in your own way, we should be only too delighted.

Yours faithfully,

JASPER RIDLEY, *Chairman.*

The following is the letter published in *The Times* on Tuesday, August 22 :

SIR EDWIN LUTYENS

TO THE EDITOR OF THE TIMES

Sir,—We believe that all those interested in the arts of our nation will wish to contribute to a memorial to the late Sir Edwin Lutyens, the greatest architect of our time. Hence a committee, set up to consider the best form such a memorial could take, has concluded that the publication of a book in three or more folio volumes covering all aspects of his work would provide the most fitting monument. It will be a permanent record for future generations of the incomparable achievement of this master, and will have great practical value for students not only in this country but, we hope, throughout the world.

Mr. Christopher Hussey and Mr. A. S. G. Butler have agreed to act as joint authors and editors of these volumes, which will contain plans, detail drawings, and photographs, as well as analytical notes intended to illustrate the genius of Sir Edwin and his high position in the historical sequence of architecture. Subscribers to the memorial fund will be entitled to copies of the work at privileged rates, which will be determined later having regard to the response to this appeal and the cost of publication. Moreover, we hope in addition to found an annual scholarship at the School of Architecture of the Royal Academy to be known as the Lutyens Scholarship. This further object, however, can be achieved only if the amount subscribed is sufficient. Donations to the memorial fund will be gratefully acknowledged by the hon. treasurer, Viscount Esher, at the office of the Lutyens Memorial, 13, Mansfield Street, W.1.

Yours faithfully,

JASPER RIDLEY (Chairman), W. H. ANSELL, CRAWFORD AND BALCARRES, ESHER, MEREDITH FRAMPTON, GREENE, EDWARD MAUFE, HUBERT WORTHINGTON.

13, Mansfield Street, W.1.

PRESENTATION TO SIR IAN MACALISTER

It has now been arranged to make the presentation to Sir Ian and Lady MacAlister on Wednesday, 18 October, at 2.15 p.m., when all those who have contributed to the presentation fund are warmly invited to attend. The proceedings will be informal, and it is anticipated that they will not last more than 45 minutes to an hour.

UNITED NATIONS WORKS AND BUILDINGS COMMITTEE

Two years after its inception the United Nations Works and Buildings Committee celebrated the completion of its work with a luncheon at Greek House, Grosvenor Square. This committee was formed as the result of a request, from the Polish and Greek members, for the interchange of building knowledge between representatives of the occupied countries and the Post-War Building Directorate of the Ministry of Works. It first met on 30 July 1942, with representatives of Poland and Greece present. During the 84 meetings held by the full committee the following additional countries were represented : Czechoslovakia, France, Belgium, Yugoslavia, Norway, Holland, China, Australia, New Zealand, and Great Britain, while the U.S.A. was represented by an observer member.

The committee covered a wide range of subjects and its work included :—

A critical study of the Post-War Building Studies ;

A search for supplementary technical knowledge in regard to building regulations, industrial practice, building controls, etc. ;

Technical and practical studies of building methods for liberated countries, including consideration of prefabricated building and the use of new materials.

A study of the principles of industrial organisation in their application to the building industry, including site organisation, use of progress charts, standardisation, improvements regarding labour, output, etc.

Four sub-committees were formed to deal with :—

New and standardised building technique.

Building organisation and the progress chart system as practised in this country and abroad.

Building regulations, contracts and wartime controls.

Repair of war damaged buildings.

Decision to disband the committee, which was quite an informal body, with Mr. John H. Markham, F.R.I.B.A. (Ministry of Works), as chairman, was taken in view of the near completion of the post-war studies within the Ministry and the completion of the work for which the committee was convened. As there are still problems connected with reconstruction work which interest technicians of the allied countries, several of the members of the committee will continue a personal collaboration independently of any official organisation.

WAR DAMAGE COSTS OF WORKS PAYMENTS

There has been such a demand for the War Damage Commission's pamphlet, *Cost of Works* (Form ROD.1), which was enclosed with the June issue of the JOURNAL, that the supply for free issue has been exhausted. The pamphlet has now been placed on sale, and may be obtained from H.M. Stationery Office, or through the booksellers, at 3d. per copy, or 25 for 5s.

CORRECTION

In the note on the War Damage Act 1943, Part 2, on page 246 of the August Journal, two lines became transposed. The sentence in question, at the end of the first paragraph, should have read :

"... indemnity against proved loss to chattels through War Damage.

Architects' Fees under Part 2 of the Act are therefore recoverable only in certain conditions, namely :—

1. In claims arising ..."

LETTERS FROM PRISONERS OF WAR

The Institute continues to receive a large number of letters from Prisoners of War, showing how welcome are the books that we have been able to send. Among recent letters, and typical of many, is the following :—

Senior British Officer : Oflag VA.

7.7.44.

DEAR MADAM,—I acknowledge with many thanks your letter dated 22 December 1943. I wish to thank you on behalf of the architects and the camp for the 70 books as well as the individual book parcels you have sent.

The books have been widely read both by laymen and members of the allied professions, the town planning books and pamphlets being most in demand. The architectural society, consisting of seven members, has given a series of lectures on architectural subjects. A Town Planning Group has been formed and students are being prepared for the R.I.B.A. and final examinations and Institute of Building examinations.

The Society are rather lacking in books on acoustics and air-conditioning, and if these books could be obtained, it would greatly help in the furtherance of the education of those members interested.

Yours faithfully,

J. DE BEER,
Lieut.-Col.,
Senior British Officer : Oflag A V.

SOME ASPECTS OF BUILDING PRODUCTION

ILLUSTRATED BY THE CANTEEN PROGRAMME CARRIED OUT BY THE ARCHITECT'S OFFICE OF THE L.M.S. RAILWAY

Any Architect who has been engaged on urgent and large-scale building work cannot have failed to be impressed by the loosely formed structure of the whole organisation for building production. By the whole organisation is meant not merely work on a building site, but all those processes of preliminary investigation, design and supply of materials and site erection which take place. Now it is the degree to which those various processes can be organised that determines speed and economy, and where this organisation of processes can take place under one roof—as in the production of aircraft or motor cars—the main stages of production, *i.e.* research, design and manufacture, can be closely and successfully integrated.

In building, on the other hand, the corresponding sections of work remain very often not only isolated and in water-tight compartments, but they develop independently and in an unrelated fashion. The efficient organisation of building work is generally considered to be a question for the builder and to be started after the contract is let. But organisation at this stage is not enough—decisions have already been made which vitally affect progress. To be complete, the organisational control must start at an earlier point. It must pass from the site to the drawing office, and even further back into the research stage, where alone the most far-reaching and general issues can be determined.

The three stages, namely, preliminary investigation, design and actual building, including material supplies, are from a production point of view mutually interdependent and must be conceived as a whole. For the architect, acceptance of this fact imposes new responsibilities from which he cannot stand aside. Nor is it to be expected that his own methods of work will remain unchanged. The following notes, which describe the system followed in a particular programme of work, are an indication of what these changes may mean. They are published not because they are complete or universally to be applied, but merely as a record of experience which may be of use in the future. The methods which they describe were, in the main, thrashed out under difficulties and pressure that allowed little time for second thoughts, and their authors are as conscious as any critic of the points at which they were least successful.

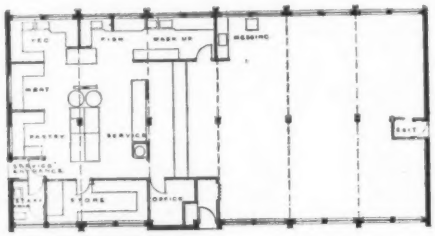
THE PROGRAMME

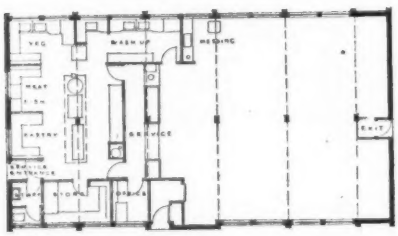
The Architect's Office of the L.M.S. Railway Company, working under the direction of Mr. W. H. Hamlyn [*F.*] with a Staff much reduced in numbers, was some time ago faced with the organisation of an extensive programme of canteen building. This programme called for the provision in all parts of the country of more than 170 buildings for the service of food to the Railway Company's employees. Rather more than half of the proposed buildings were new structures, the others being conversions of existing premises.

There were several factors which raised special problems of organisation. To begin with, the sites for the buildings were very dispersed. They occurred in towns on the L.M.S. system in which one or two buildings were required at each railway centre. Many of these sites were situated in the vicinity of locomotive sheds in outlying districts of towns with difficult road access. This extreme dispersal presented a problem much more difficult than that which would have been caused by a similar volume of work within a restricted area.

Then again, within each particular locality, the types of canteen provided called for special consideration. Normally, in a large town the railwaymen could not be served conveniently by a large centrally placed canteen. The men had to feed near their work : in many instances the number of meals to be served at each one of a group of depots within a town was not sufficiently high to justify separate cooking facilities. The problem was, therefore, eventually met by providing in each locality a main

canteen at the largest depot with sufficient kitchen accommodation to provide cooked meals for the subsidiary canteens at other points in the area, these meals being transported from the main canteen to the service canteen in containers.





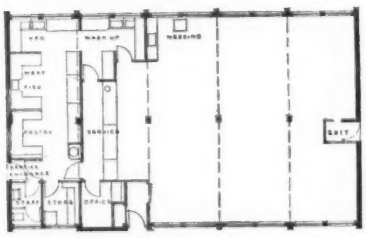


FIG. 1. *Kitchen types.*

TITLE *MAIN CANTEEN at Serving*	COR. REF. NO.
	AST. ARCHITECT AT SITE MEETG.
I DESIGN DATA	
Kitchen : To cook for on the premises	*100*
" " " " " container service	
Total	
Servery : To serve from containers	*No*
Messing : Required or not ?	*No*
Wet or dry canteen ?	*Dry*
Seating : Total peak user	*60*
" Number using messing	—
Lavatories : Male users W. Basins	—
W.C.s	—
" " Urinals	—
Female users W. Basins	—
" " W.C.s	—
Canteen staff W. Basins	*1*
" " W.C.s	*1*
Services : Electricity, Load k.W.	*2.7 kW.*
Gas	*1000 c.ft.*
Water	

II SITE DATA			
Location *Near Passenger Station on Southern side of Rly. Co.'s road to M.P. Depot.*			
Line or Rating Plan : **No.** **Scale**			
Nature of Work : **New Bldg.**			
III. RECORD	BEGUN	COMPLETE	INITIAL
Site Meeting	*20.8.42*		
Report to Mr. Wallace	*21.8.42*		
Site Survey	*6.10.42*		
Site Drawing			
Sketch Drawings			
Estimate			
Passed to C.O.M. Approved			

FIG. 2. *Job Sheet.*

SITE SURVEY SHEET	**QUANTITY SURVEYORS.** 1.
Station. *Mansfield.* **Site.** *Turntable.* **Date.** *1st May, 1943.*	*Sigd.*
Site Surface. What is the nature of the ground surface, grassland, garden soil, etc.?	*Garden soil.*
Is the ground surface (*a*) fairly level with even (or uneven) surface, or (*b*) slopes moderately with even (or uneven) surface, or (*c*) slopes considerably with even (or uneven) surface ?	*Fairly level and even.*
Fences. Is the site enclosed ?	*Partly.*
If so, what kind of walls, fences, hedges, etc., enclose the site ?	*Post and rail fence to South. 3 ft. 6 in. high rubble wall to footpath.*
Would it be necessary or convenient to take down part of such walls, etc., to give access to site and, if so, what would have to be taken down ?	*No.*
Would such taking down have to be replaced ?	
Nearest Siding. What is the full address of the nearest siding for public use ?	*MANSFIELD GOODS, L.M.S.*
How far (approximately) is this siding from the site ?	*One mile by road.*
If there are nearer and more convenient railway loops, dead-ends, etc., which are normally reserved for railway staff only and which the Contractor might be allowed to use, give particulars and full address for trucks.	*Yes. Turntable dead-end. MANSFIELD (L.M.S.) NORTH JUNCTION TURNTABLE.*
Approximate distance of such loop, etc., from site.	*100 feet.*
If Contractor were allowed to use such loops, etc., for his trucks, would flagmen have to be used during the unloading of trucks ?	*No.*
Access to Site. Indicate a suitable access to site for Contractor's men avoiding railway lines if possible.	*Via Sibthorpe Street and footpath, or Tenter Lane and footpath.*
Would flagmen be required to protect Contractor's men to and from site ?	*No.*

FIG. 3. *Site Information Sheet.*

The canteens were therefore of two types :

(*a*) Main canteens capable of providing cooked meals for 100, 150, 200 or 300 and with seating ranging from 50-300.

(*b*) Service-type canteens with a small service with hot cupboards, store, etc., and small cooker for snacks.

Both types of canteen had to make provision for messing facilities—a boiling water supply, a sink and a cooker—for those using the canteen but bringing their own meals.

Preliminary Site Information

The collection of the necessary preliminary data was carried out in the following way. In the first instance, a site meeting was held in each centre at which decisions were made with regard to the siting of the central canteen and its subsidiaries, and the numbers to be catered for from the point of view of cooking and seating. This information was recorded on a *Job Sheet* by the assistant attending the meeting. This was followed up by visits by the architect's representative to each site in turn in order to secure the necessary technical information. It was found most convenient to obtain this information by using a block plan on which the existing services could be indicated, and by means of questionnaires or *Site Information Sheets* recording the nature of the soil, position of drains and services, any special problems of access to the site and any other information necessary for the preparation of schemes and estimates (see Figs. 2 and 3). The site information sheets were made as complete as possible so that they could also provide information for those concerned with heating, lighting, telephones, etc., who had normally in the past sent their own separate representatives to each site. Thus one man was able to collect all technical data and—equally important—record it in an economical and standardised method.

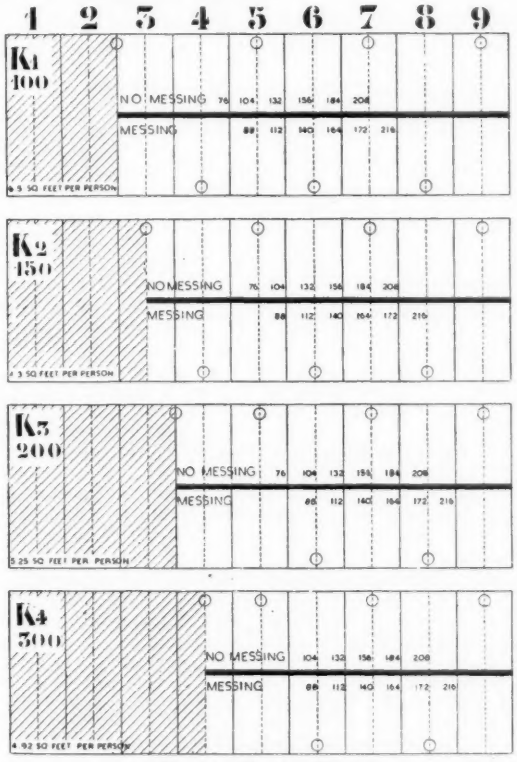


FIG. 4. *Planning Chart.*

Standardisation of Planning

Although a considerable degree of flexibility in planning was needed to satisfy local conditions, it was necessary to standardise as rigidly as possible, first, to meet the space requirements laid down for kitchen areas by the Ministry of Works and Buildings, and second, in order to secure the maximum advantages of simplicity and speed of production and erection. Standardisation of planning, such as the most convenient seating arrangements and spacing of kitchen layout, had to be integrated with the most economical form of structural unit, and was eventually based on a unit of space measuring 18 ft. by 12 ft. Multiples of this unit could be arranged either for single-span or double-span types, the latter giving an overall width of 36 ft. The planning of kitchens for 100, 150, 200 and 300 meals, and the arrangement of seating, taking into consideration stoves, service space, etc., was worked out and was then translated diagrammatically into the 18-ft. by 12-ft. units (see Fig. 4) so that it was possible for an assistant attending a site meeting (having been given the numbers of meals to be cooked and the number of persons to be seated) to give at once the area of land required by the canteen ; this diagrammatic planning chart also took into consideration the additional space required in certain cases for messing facilities where the users of the canteen preferred to cook their own snacks.

Choice of Materials and Structural Methods

Working on the 18-ft. by 12-ft. unit, possible structural systems were examined from the following points of view :

Cost :	(*a*) of materials.
	(*b*) of erection.
Speed of erection assessed in man-weeks.	
Delivery :	(*a*) initial delay from from placing of order.
	(*b*) rate of delivery after initial order.
Use of Controlled Materials :	(*a*) steel —— tons.
	(*b*) timber —— cu. ft.
	(*c*) any other materials.
Maintenance—assessed as percentage of first cost.	
Insulation Values :	Thermal transmission co-efficient for
	(*a*) walls.
	(*b*) roofs.
Number of Trades :	Number of trades on site for completion of carcase.
Transportation :	Assessed in terms of ease of handling, possibility of damage, location of manufacturing centre, as "good, moderate or bad."
Daylight Factor :	Assessed only for constructions where window area is limited.

These assessments showed that most traditional forms of construction were, in the complete sense, comparatively slow in production and used excessive quantities of prohibited materials. On the other hand, proprietary systems failed under one or more of the other heads—usually because they had been developed by firms or associations interested in only one material. Again, proprietary systems were not always suitable for erection by local builders on isolated sites. Accordingly a composite form of construction was eventually worked out which appeared to give the best balance of qualities for all purposes.

This system consisted essentially of 9-in. brick walls with piers at 12-ft. centres, the dimension between piers taking conveniently two standard windows with the necessary responds to give a bearing for the concrete lintols. The lintols themselves were "L" shaped in section, carrying a 4½-in. thickness between the window head and the eaves, where it was protected by the overhang of the roof.

Light tubular steel trusses were designed by Mr. F. J. Samuely to span across 18 ft., the width of a single-span building. In the case of a double structure, pairs of similar trusses were used, with their inner ends supported on brick centre piers. The roof consisted of light latticed steel trusses and purlins, carrying tubular rafters at 2-ft. centres and of special section designed to take 2½-in. wood-wool slabs, the wood-wool slabs* being screeded and covered with felt.

Both purlins and trusses were made from a combination of

* This material was used as external walling slabs in the chalet buildings in the Prestatyn Holiday Camp completed by the L.M.S. Architect's Office in 1939. Its record at Prestatyn gave every justification for further use.

FIG. 5. *Roofing system.*

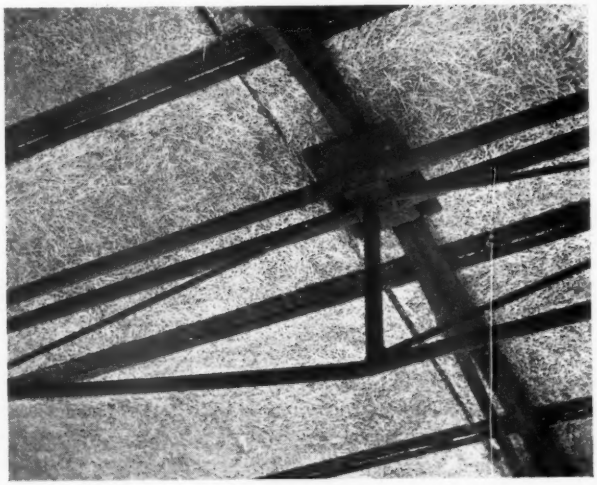


FIG. 6. *Detail of roof steelwork.*

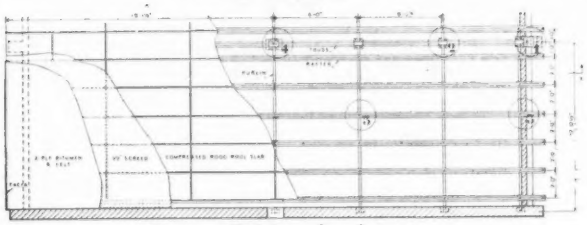


FIG. 7. *End bay of roof structure.*

tubes, round bars and flats. These sections are not generally used for riveted roof trusses because of the impossibility of drilling holes for the rivets, but with welded steelwork the most suitable sections can be applied, namely, tubes for compression, because they have the greatest stiffness against buckling, and round bars and flats for tension because they are the easiest to work. In the welded canteen trusses no gusset plates were required, and apart from the batten plates for the upper chord of the trusses, which consists of two tubes, no cleats were used. These batten plates served, at the same time, as a connection between purlins and trusses. As the span of the rafters is only 6 ft., and as a flange had to be provided to carry the roofing material, it was not worth while to introduce latticed construction. A section was developed consisting of a tube with two fins welded on, weighing 2.25 lb. per ft. run as compared with 4.07 lb. per ft. run for the smallest tee section for the required strength. The assembly of these rafters was rather difficult at first, but special jigs were constructed which simplified the production. It was found to be sufficient to weld at 12-in. centres with a 1-in. weld. The attached table shows the comparison in weight between the construction as carried out, the construction made from R.S.J.'s, to carry the same load, and a construction of R.S.J.'s to carry a roof of the conservative type :

	As carried out.	*Same Load R.S.J.'s.*	*To carry roof of conservative type (concrete with asphalt)* *Angles.*	*R.S.J.'s.*
	lbs.	lbs.	lbs.	lbs.
Each Purlin 12-ft. span	60	78	300	132
Each Truss 18-ft. span	150	324	—	450

In order to check practical details, such as the accurate setting out of fixing of trusses, etc., to the precast concrete padstones and correct dimensions and tolerances in the manufactured items, a full-scale model of a standard bay of the proposed system was erected, which resulted in one or two minor modifications of the design. When this model was finally approved, action was taken in connection with the bulk ordering of materials to allow production to get under way.

Office Work

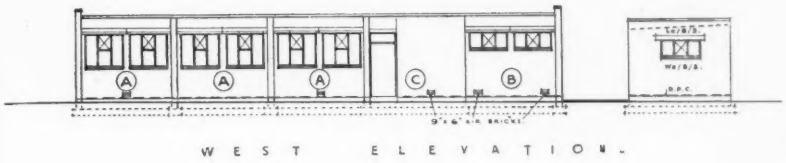
With the preliminary information covered on the *Job Sheets* and *Site Information Sheets*, and the structural system established by actual test, it became possible to simplify office work. Sketch drawings could be made rapidly, and as the information regarding canteens was collected together it became obvious that certain types of canteens would be repetitive and would only require handing to suit the site.

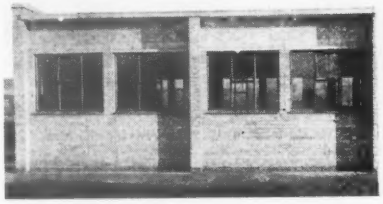
The main part of the rationalisation in this work took place at the working drawing stage. It was obvious that complete working drawings would be needed for each kitchen layout, *i.e.* kitchens for 100, 150, 200 or 300 meals. These standard kitchen layouts could easily be handed to meet different site conditions. The whole of the seating area, whether for 50 or 100 people, could be shown on one single $\frac{1}{2}$-in. detail drawing. This also would need handing. These sets of drawings formed the standard $\frac{1}{2}$-in. details necessary for any building. The general $\frac{1}{8}$-in. scale drawing obviously could not be a standardised drawing on account of variable elements, such as levels, etc. But, even in this case, much work was eliminated and the drawing left in a diagrammatic form, as the $\frac{1}{2}$-in. details already covered effectively the general structural system.

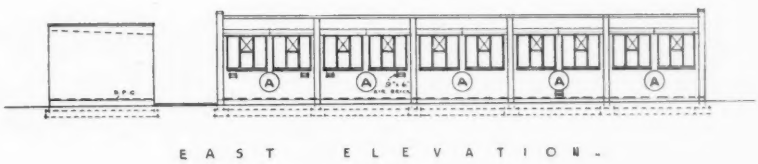
The second major consideration in preparing the working drawings was to relate them as closely as possible to the builder's requirements on the site and to allow them to be used easily in relation to the bulk ordering of materials which was envisaged: The measures taken were as follows :

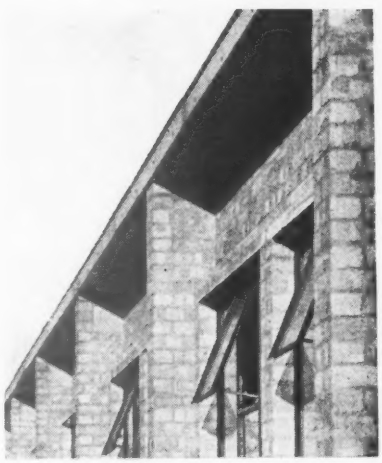
(*a*) A builder erecting a canteen was first concerned with the excavation and the general shell of the building. All fittings and internal walls were actually built on the site concrete and therefore were of no immediate concern whilst the main structure was being erected, except from the point of view of positioning of drain outlets. The $\frac{1}{8}$-in. scale drawing could, therefore, concern itself only with illustrating the main dimension of this structural shell, the elevation being purely diagrammatic to show the application of the three types of wall panel which were used in any building and which were covered by the $\frac{1}{2}$-in. detail.

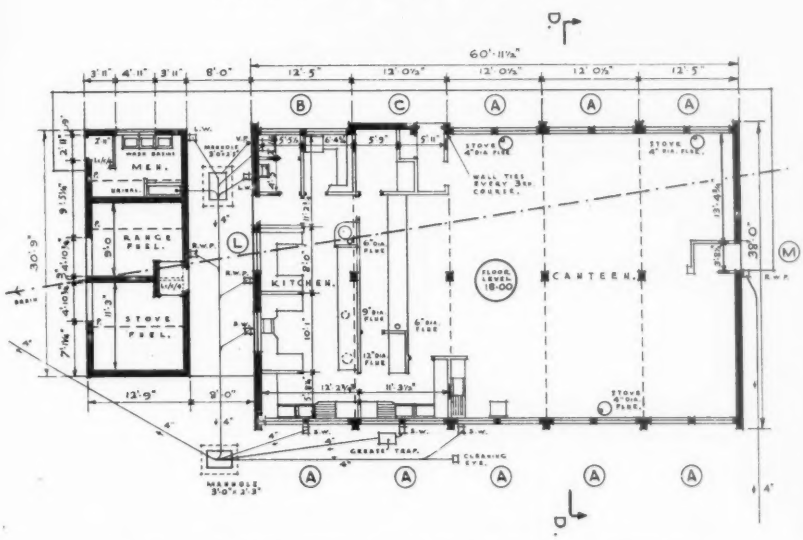
(*b*) The parts of the structure, *i.e.* lintels, steel windows, roof trusses, wood-wool slabs, asbestos fascia, having been bulk-ordered, were supplied to the builder, who was only interested in them from the point of view of erection. The drawings could, therefore, eliminate any description and merely refer to these parts of the building by a code











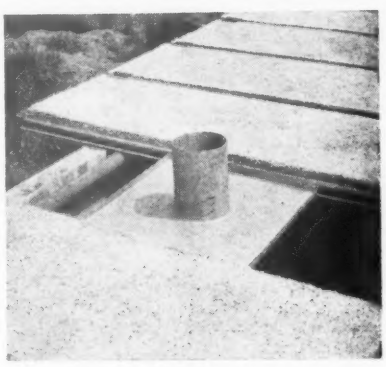


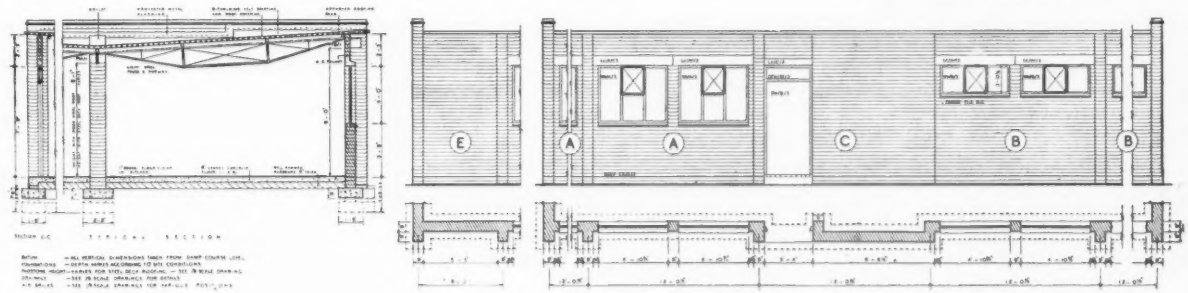
FIG. 8. *Typical ¼-in. working drawing for a five-bay canteen cooking 100 meals, seating 112 and providing messing facilities.*

FIG. 10. *The standard window bays.*

FIG. 11. *Detail of fascia and window head.*

FIG. 12. *Detail of stovepipe sleeve.*

FIG. 9. *Extract from the sheet of standardised ½-in. drawings applicable to all types.*



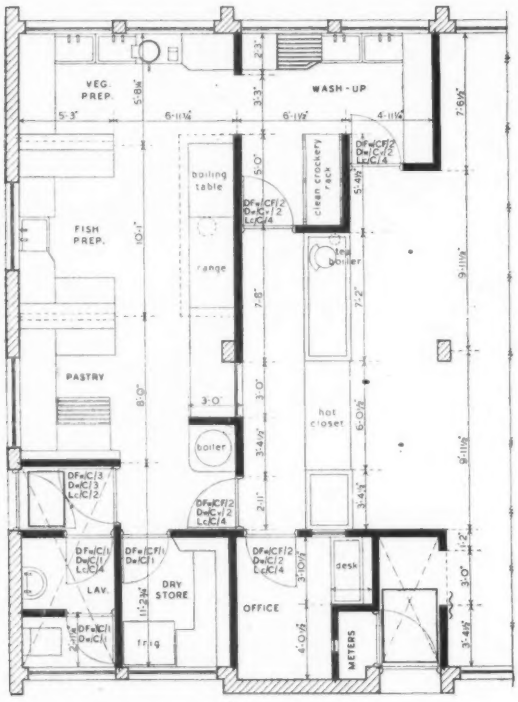


FIG. 13 (*on left*). *Kitchen plan : 100-meal type.*

number. The builder could check his deliveries by means of the *Code Sheet* (see Fig. 14), on which materials supplied by bulk orders were described. The *Code Sheet* was extremely simple, each item being described by three terms—for example :

Lc or C = Concrete lintel A, B type : $8\frac{5}{8}$ in. × 9 in. : $5\frac{5}{8}$ in. × 9 in. and $5\frac{5}{8}$ in. × $4\frac{1}{2}$ in.
1, 2 or 3 = lengths : 2 ft. 5 in.; 4 ft.; 5 ft. $7\frac{3}{4}$ in.
} Example—Lc/C/2

The materials arrived on the site marked with the code number and were placed in position as shown on the drawings. The system lends itself easily to *all* types of bulk-purchased materials and provides a common language for manufacturer, architect and builder.

These considerations of standardisation of drawings and relation of drawings to site operations led to the following grouping and order of drawings for each contract for a main canteen—a similar procedure was followed for all service canteen buildings.

1. General $\frac{1}{8}$-in. scale plan showing :
   (*a*) setting out of external walls, foundations, etc. ;
   (*b*) drainage ;
   (*c*) levels ;
   (*d*) key elevations only ;
   (*e*) outline only of internal walls for fixing bonding position to external walls.
2. Code Sheet (common to all canteens).
3. $\frac{1}{2}$-in. details ; external wall panels (common to all canteens).
4. $\frac{1}{2}$-in. details ; roof steelwork (common to all canteens).
5. $\frac{1}{2}$-in. kitchen layout of required type (100, 150, 200 or 300) (common to all similar kitchen types).
6. Elevations and sections kitchen fittings (common to all similar kitchen types).
7. $\frac{1}{2}$-in. detail messing bay if required (common to all types).

As a result of this system any number of buildings in which the actual area of seating accommodation varies, and including all four types of kitchen, and being varied in each case to suit aspect and approach, would require only one new drawing for each building, the remainder being provided by printing from

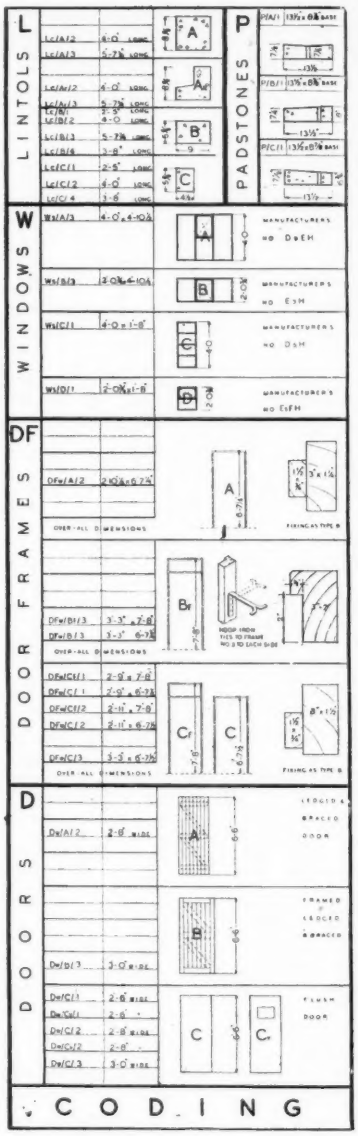


FIG. 14 (*on right*). *Coding diagram.*

the handed negatives of the standard drawings. To form some sort of contrast it might be borne in mind that twenty buildings varied in this way and dealt with as separate buildings would have required 140 special drawings to cover the same ground.

The working drawings were made on sheets standardised in height. When a contract was let, a selection of the required standard details was made and the specially prepared $\frac{1}{8}$-in. plan added to these, and all drawings were then clipped together to form a book of drawings for the contractor.

In order to continue and complete the standardised nature of the programme, the contracts for the building of the canteens were based on the Ministry of Works and Buildings standard schedules of prices and standard Bills of Quantities were prepared on this basis ; assuring that tenders were submitted in comparable form without undue risk of fluctuations in prices.

Bulk Ordering of Materials

The principle of standardisation of parts of the structure

without sacrifice of the necessary flexibility to meet the different plan requirements which have been described, allowed the bulk ordering of the maximum number of building components. The chief merit of this bulk ordering lay in the fact that orders could be placed for roof trusses, for example, which would bear a proper relationship to the weekly or monthly production of the manufacturer. Certain items of the building were selected for bulk ordering; these included roof steelwork, windows, doors, asbestos rainwater goods, flue outlets, reinforced concrete lintels, etc. Manufacturers of the various bulk-ordered items were selected on a geographical basis to give easy transportation of goods. The manufacturers of each item were contacted in the first instance to ascertain the most convenient numbers in which orders could be placed and to obtain a programme of delivery dates. Orders conforming to these rates were then placed. By this means the railway company was assured of a programmed delivery to every building. Had each individual building been dealt with on its merits the separate orders would have borne no relation to the production possibilities of the various manufacturers, and delays would almost certainly have occurred. But, on the other hand, by taking this step the responsibility was placed upon the Architect's Office for covering orders which would normally have been dealt with by the builder. These conditions, in turn, led to changes in the form of contract. It is interesting to note the simplification of ordering that this method entails when compared with normal practice.

Target Building Programme

The co-ordinated delivery of materials obtainable under bulk ordering removed to the maximum extent the possibility of the contractor being delayed by delivery of the various building items. It was thus possible to gauge much more accurately the time needed for the erection of a canteen.

The traditional progress schedule for building work was made up often by guesswork and assumption and was rarely adhered to in practice. It was not a contract document, and the architect had no power to compel the builder to keep to it. On the other hand, as the length of time for each trade was not determined on any rational basis, it was impossible to modify the schedule to take account of actual conditions on the site. Hence, once the work had fallen behind, as usually happened early in the job, the schedule became useless for forecasting when materials and specialist trades would be required on the site.

To overcome these disadvantages a new type of target building programme was devised for use on the canteen programme. The central idea behind the new programme was the assessment of the total man-hours required for each of the major trades.

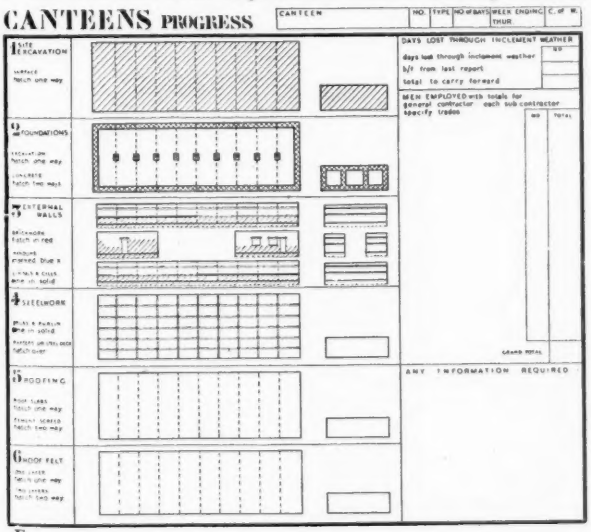


FIG. 15.

This was made possible by the publication in 1943 of standard rates of work in connection with the payment by results scheme instituted by the Ministry of Works. The buildings in the canteen programme were standardised and, in consequence, the unit quantities per bay could be multiplied to give the total quantities for any particular building. From these quantities the man-hours could be obtained by dividing by the Ministry of Works' standard rate. The form on which these calculations were made is illustrated (Fig. 16).

The actual programme was plotted on squared paper. Each division horizontally represented a day, and each vertical division represented a man. Thus each trade was represented by a rectangle whose area was the total number of man-days required to complete the work. The programme was drawn with an appropriate assumed number of men in each trade. If, as a result of local labour conditions, the number of men actually available was greater or less, it was easy to reduce or extend the length of time allotted; the area of the rectangle remaining constant. A typical target programme is illustrated (Fig. 16). Further, it was possible for the clerk of works to keep an exact record of the job by blacking in squares for each man-day worked on each trade; and thus check the accuracy of the target programme.

Progress Reporting

In the organisation of a large building programme it is vital for the central office to have a clear and accurate picture of the progress of the work on all the sites. The usual method of reporting, in terms of percentage value of the work completed, is highly unsatisfactory. In the first place, the foreman or clerk of works cannot be expected to assess the percentage value accurately, and usually makes an estimate by guessing. In the second place, in modern work the delivery of costly specialist items to the site often makes the total value of the work quite disproportionate to the actual progress.

To obviate these disadvantages, and to make easier the work of the man on the site, who should be freed as far as possible from office work, the graphic report sheet shown in Fig. 15 was produced. This showed in diagrammatic form the various stages in the building progress. All that the clerk of works had to do for his weekly report was to hatch over the portions of work actually completed. The result was a vivid, detailed and accurate picture of the progress from week to week, and in the office it was possible to see at a glance the position on any of the sites.

The description of the new methods by which this canteen programme was carried out follows roughly the chronological order in which the various phases of work developed. No attempt has been made at classification, but basically it will be seen that the work falls into three distinct, though essentially inter-dependent, stages which are summarised generally below:

(1) The first stage is that of research and development. Quite apart from the fundamental work of the Building Research Station, the architect for any large programme must make his own assessment of the materials and methods. He must also establish standardisation to allow the maximum advantages from the point of view of production and supply without sacrificing flexibility required by

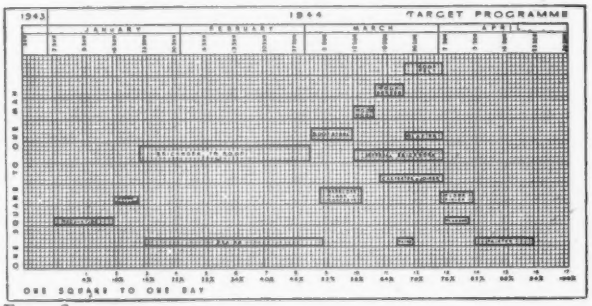


FIG. 16.

planning. An assessment of this kind must involve consideration of the two succeeding stages described below. For example, the type of building adopted in the canteen programme was very largely conditioned by the widespread distribution of sites and the employment of local builders: had buildings of similar type been required on one single large site it is certain that the structural form would have been considerably changed through a decision made at the research stage, and this decision would have turned entirely on the question of production.

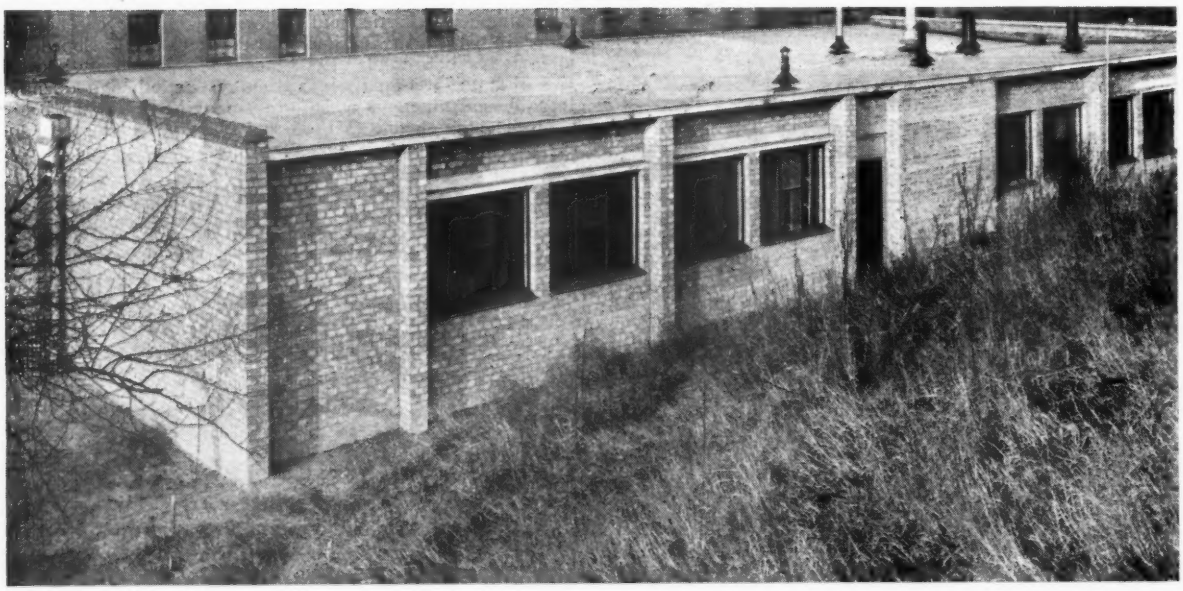
From all points of view the research stage will certainly require full-scale test models.

(2) The problem at this stage is to apply through planning and design the facts established by the preliminary research. Whilst this application in canteen work was relatively simple, it is obvious that more subtle constructional principles and more complicated planning problems would give scope for ingenuity of design without losing the advantages of standardisation required at the production stage. Although the architect's drawings would probably still follow existing methods at the design stage, there is a case for a revision of the whole technique of the working drawing to relate it specifically to the production angle.

(3) The problem of production is not merely one of building but also of supply. The research carried out at the first stage suggests methods of construction that will enable questions of supply to be related to manufacturers' problems. In order to ensure this, it may be necessary for the architect to control such matters as bulk ordering and certainly to take a much more important part in the timing and control of building operations. The development of time and progress schedules on a sounder basis is the natural outcome of such considerations.

It is in the degree to which the three activities can be separately developed, but at the same time co-ordinated into a general plan, that future building organisation can be controlled and improved. From the point of view of the architect, a recognition of this fact entails not merely a change in normal design methods, but an extension of work into research at the preliminary stages and into greater responsibilities during the course of production. It is often assumed that the large programme involving repetitive work and "prefabrication" must limit and de-grade the architect's work, but it is apparent that, whilst the architect's work may change, its scope can, on the contrary, be extended. The question of "prefabrication" which so often clouds the issue is only one aspect of a more general problem. Factory production in some degree or other will always be present in any problem. The degree to which it can be most effectively used will be determined by the initial research. But, at whatever level it is used, the maximum effective production can only be achieved by the closer integration of the three stages of research, design and production itself, and it is in this respect that the architect stands in such a unique position and has the opportunity of contributing so much.*

* Full-scale prefabrication, including plumbing and electric wiring, was in fact carried out by the same organisation to deal with the rapid provision of "Railbars," *i.e.* small open access feeding points on station platforms. The Railbar is a completely prefabricated structure arriving in an L.M.S. container and capable of erection by a skilled team in six hours. For full description, see *Architectural Review*, 1943, Nov., pp. 135-6.



Evesham, Worcestershire

THE SOUND CONTROL AND HANGING OF CHURCH BELLS

BY MAJOR J. H. R. FREEBORN, M.A., F.S.I. [*L.*],

Member of the Ancient Society of College Youths, the Cambridge University Guild of Change-Ringers and of twenty-one other ringing societies.

The lifting of the ban on the ringing of church bells after a silence of three years was hailed everywhere with the liveliest enthusiasm, sufficient evidence of the traditional love which the English have for their bells, a love which has earned us the title of "The Ringing Isle." It is, therefore, to be anticipated that, in the post-war era there will be a popular demand for the replacement of bells destroyed by enemy action, for the restoration or augmentation of existing peals to commemorate the victory, or as a memorial to the Glorious Dead, and for the provision of bells in the churches which will adorn new areas of population. In these schemes architects will be concerned, and they will wish to be in possession of the latest practice with regard to the construction of bell-towers and bell-frames, of the methods for sound control, and the amenities required for the proper ringing of the bells.

Costly Fittings

The number of architects who are ringers can be counted on the fingers of one hand, and so I make no apology for reminding them that the art of ringing a bell in changes demands long practice, concentration and patience, and can only be successfully accomplished if the installation is planned with due regard to their requirements. The bells of a church compete with the organ as the costliest of its fittings, ranging as they do from £1,000 to £3,000, or more. It is no exaggeration to say that of the six hundred odd towers I have visited, there is scarcely one in which everything to do with the bells is perfect. No organist would tolerate conditions in his organ such as exist in many belfries. Out of sight, out of mind. . . . If the ringing of our church bells is to be maintained, ringers must be given the best possible conditions, and sentiment be tempered by experience.

Sound Control

A ringer once called a friend's attention to the sound of a near-by peal, explaining how difficult an accomplishment it is. The friend expressed his regret that it was not so difficult as to be impossible. It behoves us, therefore, to take the proper steps to avoid the nuisance of noisy bells. To prevent undue noise in the immediate vicinity, and to make the bells "carry," the effect of the usual window louvres, which throw the sound down, must be counteracted. The ideal tower is one which has no belfry windows or, at any rate, small ones immediately below the roof, with a louvred lantern or a spire above. The windows and/or lantern, with properly adjusted louvres, throw out the sound-waves horizontally, and in the case of a spire there are usually small gabled openings. If these are absent, the sound will still pass through the comparatively thin masonry. The lantern may be formed so as to be hidden by the parapet, as at Lincoln Minster, or a feature can be made of it, as at Fotheringay. The well-known peal at Lavenham was never heard to such advantage as when the tower roof was removed for repair.

Blocking-up Windows

There should be a height of at least twelve feet between the lip of the tenor bell, when uppermost, and the cills of the windows. In existing towers the bell-frame should be lowered to meet this condition, or the windows should be partially blocked up, or both. The best method of blocking-up is two thicknesses of match-boarding, with sarking-felt between, and ruberoid on the outside. At Lincoln the bell-frame was lowered 25 feet, reversible louvres were fitted to the windows and a lantern erected on the roof, hidden by the parapet. (It should be noted that the lowering of the bell-frame increases the stability of the tower.) The reversible louvres were not a success and subsequently the windows were boarded up to the springing. The result of these alterations was that the noise, which had been almost unbearable in the immediate vicinity, is now pleasantly modulated, in spite of the increase at the same time of the bells from eight to twelve; and, moreover, the bells are well heard over the whole city, and are audible in villages nine miles away. In short, the tower had become a diffusing shaft and, generally speaking, the taller this shaft the more melodious the result. In the accompanying section I have shown a roof lantern, but the window area, approximately 153 ft. sup., is alone adequate. A lantern would only be essential if the window area were less than 80 ft. sup. The special virtue of a roof lantern would seem to be that some of the sound finds egress at a higher level and, impinging on the vertical face of the parapet, is thrown upwards before it falls, like a fountain. The unboarded window area at

Lincoln is computed at 150 ft. sup., but is at a very much higher level than that of the average parish church.

Louvres

That part of the window which is left unboarded must be fitted, behind the tracery, with small louvres, fixed at not more than 35 deg. slope, and nine inches vertical height, not overlapping. A galvanised wire screen, of No. 8 gauge, and at one-inch centres, must be fixed to the inner edges of the louvres. In smoky districts this screen should be of cupper wire. Successful results have been thus obtained at All Saints', Loughborough, and elsewhere.

Internal Insulation

Coming to internal arrangements for sound control, it is now the ringers, and not the public, who have to be considered; and in this connection the materials of which the tower is constructed are important. Sound runs down the walls to a greater extent in brick towers than in mediæval towers of stone, which have an absorbent rubble core. Brick towers need, therefore, more insulation than stone towers of similar height. Risk of fire dictates the provision of fireproof floors, for which brick or other aggregate less dense than ordinary ballast should be used. These floors should be insulated from the walls, so that air-borne sound, impinging on the concrete surface, should not be conveyed down the walls. No part of a bell-frame or its foundations should be in contact with a concrete floor. The nuisance of excessive sound in the ringing room is caused by sound running along the foundation beams and down the walls. As these beams cannot be insulated from the walls without impairing the rigidity of the frame, heavy fibre pads may be placed between the frame and beams at all bearing points, thus breaking the connection between metal parts. Sound travels similarly along wooden beams, but the joints act to some extent as disconnectors. There should be a floor four feet below the base of the bell-frame, to allow easy access to the under-bell fittings, lighted by electricity where available. Electric lights should also be fitted in each corner at six feet above the bell-frame. A second floor between bells and ringers is essential, and where there is an intermediate or clock loft, this condition is satisfied. If there is no intermediate loft, the second floor may be fitted about twelve feet above the ringing floor, and, in any case, must be independent of the floor above. Cabot's quilting or celotex are good mediums in conjunction with boarding, and should be packed tight all round the walls.

Rope Trunks

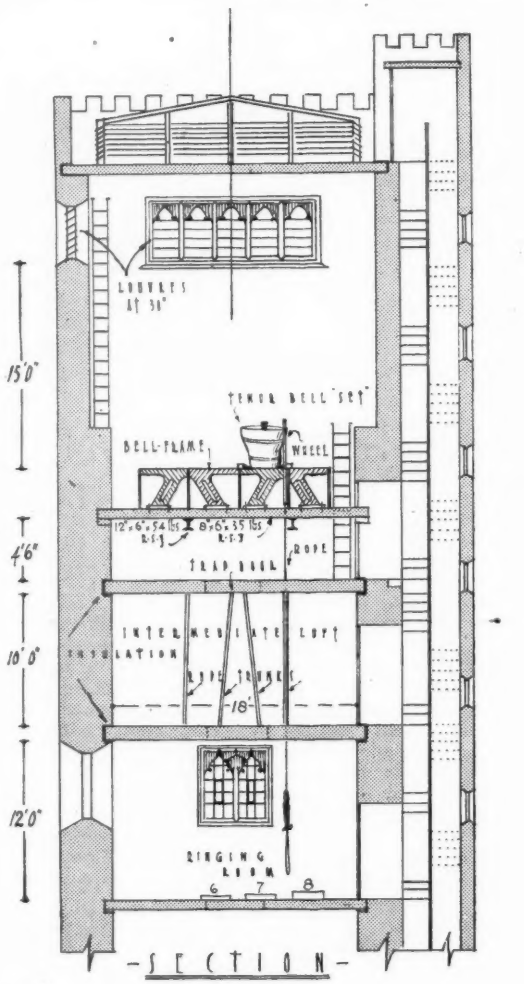
The space between the two floors serves the double purpose of sound-control and of vertical height in which to "draw" the ropes into a proper circle, for, as will be seen from the plan, bells cannot be hung so that all the ropes fall naturally in a convenient position. For this purpose, three-sided wooden trunks are used, and are not to be enclosed except in the case of the trebles of a peal of ten or twelve, which may be in a "rider" frame or otherwise not large enough to compete adequately with their big brethren. For, of course, enclosed trunks act as sound tubes. Independent trunks connected to sounding-boards fitted above small bells hung in a "rider" are sometimes necessary. Trunks are fixed at the required slope, all salient edges being fitted with hardwood rubbing-pieces, or, better still, small rollers.

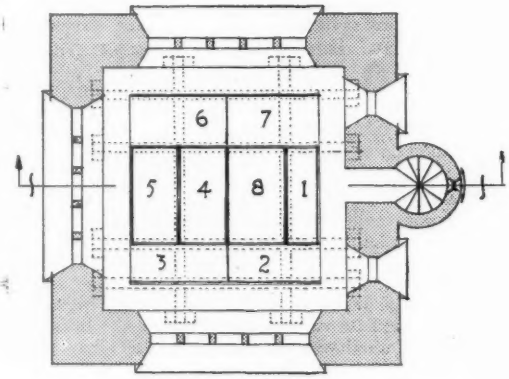
Clock Loft

Where there is a clock-loft above the ringing-room, the pendulum and weights should not be allowed to protrude below the ceiling. But if this cannot be avoided, these clock appendages must be contained in casing very completely insulated, and a couple of feet of sawdust packed at the bottom of the weight-shaft. If the clock-loft is lofty, the two wooden floors, with a lime-plastered ceiling to the ringing-room, are sufficient for sound control without special insulation. If the bell-frame is lowered, there may be height enough to put the clock above the bells, but in this event, safe and easy access must be provided. Chiming clocks are a nuisance from the bellhanger's point of view, for they entail a maze of wires, levers, and hammers. But they are so often demanded by the parish that they have to be tolerated with a good grace.

The Ringing Room

The ringing-room should not only have a plastered ceiling, but the walls should be plastered in preference to boarding or panelling. There should be a good central light nine feet from





the floor. The ceiling should not be less than twelve feet, and not more than fourteen feet high. If there must be a greater height, rope guides should be fitted at twelve feet, for a long draught of un-guided rope makes ringing difficult. Boxes, graduated in height according to the size of the bell-wheels, should be provided for the ringers of all bells having wheels of 5 ft. 9 in. diameter and upwards. This keeps the rope clear of the ringers' feet, and affords better bell-control. Such boxes or pedestals range from 3 in. in height for an 11 cwt. bell (5 ft. 9 in. wheel) to 2 ft. 6 in. for the tenor of St. Paul's Cathedral (63 cwts.), where all twelve bells have graduated boxes. Large ringing-rooms may be fitted with a wash-basin, but only if water can be laid on and a waste pipe fitted. If a urinal is desired, it should be contrived on the church roof, and unless that is possible, it should be omitted. If there is a door from the ringing-room or intermediate loft into the church roof, it should be fireproof, and if the ringing-room floor is also fireproof, an outbreak of fire in the tower is isolated.

Turret Stair

There should be a turret stair from the ground level to the tower roof, with access to the ringing-room, clock loft, belfry, and tower roof. At its base the access should be to the church-yard and not to the church, and it should be well lighted with glazed windows and electric light where available. The stair doorways should be insulated, as sound runs down the stair shaft. A convenient type of turret is the " midwall " type like that at Ashburton. Access to the bells and roof by a series of internal ladders and trap-doors is undesirable from the point of view of the steeple-keeper, the general maintenance of the fabric, and the ringers. Indeed, all fixtures in the ringing-room, such as ladders, clock and weight cases, pendulums and beams, more or less obstruct the ringers, and increase the difficulty of their job. The ringing-rooms at Hereford and St. Albans Cathedrals, to instance only two of many, are a maze of huge beams which seriously obstruct vision.

Windows

Where a ladder from the ringing-room is inevitable, it should take the form of a circular iron stair set in a corner, and the trap-door at the top should be doubly insulated. The ringing-room should have at least two windows with a total area of one-eighth of the floor space. The cills should be six feet from the floor, to avoid glare while ringing, and the opening lights, which should be liberal, are best if top-hung to open outwards, or pivoted. The central trapdoors in all floors should be 3 ins. wider than the diameter of the tenor bell, and doubly insulated.

Ringing Gallery

In a western tower, where there is an arch in the east wall of the ringing-room, or where the ringers ring from a gallery open to the church, a screen should be fitted, to muffle not only the sound of the ropes as they fall upon the floor, but also the voice of the conductor as he calls the " bobs " and corrects mistakes in ringing, as he must do, in an immediate and no uncertain voice.

The Bell-frame

The bell-frame or cage must be most carefully considered. There is no doubt that where expense is no object, a low-side teak frame is the best job. But nowadays it will cost 30 per cent. more than a metal frame. Oak is not to be recommended unless it has been " in stick " for many years, and even then it is subject to never-ending shrinkage, which means constant tightening of the through-bolts, a job which often does not get done until it is too late. It used to be considered that a timber frame (which meant oak) has a longer life than a metal frame. But it is now recognised that, as the cast-iron part of the metal frame does not rust, and corrosion of the steel part, protected as it is from sun and rain—and painted every seven years—is negligible, a metal frame is likely to outlast an oak frame. In belfries inadequately protected from the weather decay set in, weakening the joints, so that eventually they fail as a result of the *very considerable stresses which attend the swinging of bells through a complete revolution.*

Materials

When reconstruction is being undertaken, the old oak frame should be most carefully inspected to determine if it is in good enough condition for adequate repair. If there is doubt that the bells will " go " well after repair, without hurt to the fabric, the old frame should be scrapped, especially if it is a high-sided " post " frame as opposed to a low-sided strutted frame. It is, of course, desirable to retain the oak frame wherever a satisfactory job can be guaranteed, but sentiment should give way to judgment, for, after all, the bells are in the tower primarily to be rung, and if they " go " badly, they will not be rung often, if at all, and the object of the restoration will have been defeated.

Area of Tower

If a new frame is decided upon, the area of the tower, other considerations apart, should control the choice of wood or metal. Wooden frames occupy more space than metal, and if the bells can only be fitted in on one level if the medium is metal, wood should not be employed, since this would necessitate a " rider " or hoisted frame for the small bells, an expedient to be avoided whenever possible, and particularly because wooden " riders " are more difficult and costly to construct than metal. It is better to reduce the size of the peal so that all the bells can hang on the same level. If there must be a " rider," it should be built above and as part of a metal " H " frame, having its upper ends built into the tower walls.

Number of Peals

We possess about 50 peals of 12 bells, ranging in size from the 72 cwt. tenor at Exeter to the little 12 cwt. tenor at Surfleet. There are probably over 250 peals of ten, and altogether there are upwards of 6,000 towers in which there are ringing bells. Architects may, therefore, expect to have to deal with the higher numbers, as to which the question of a " rider " frame may arise. Twelve bells are great fun from an expert ringer's standpoint, but I think that the man in the street is as well or better satisfied with eight or ten. To the trained musical ear, ten bells are the most satisfying, and this number might well be the future limit

Sound Affected by Materials

It is reasonable to suppose that a metal frame tends to amplify the vibrations of bells, and it has been held that a wooden frame mellows their voices. After studying the tone of some hundreds of peals, I have come to the conclusion that the substitution of a metal for a wooden frame creates a material change of tone perceptible only to the prejudiced or ultra-imaginative, and I have brought to this study a lifelong acquaintance with musical tone and a long musical training. It has also been held that a wooden frame is more seemly in a sacred building than a metal. But is not this to condemn the many splendid metal screens and reredoses, lecterns and altar rails which grace our churches? And, by the same token, should not all organ pipes be of wood?

Foundation Beams in Wood

The " lowside " bellframe, whether of wood or metal, must be clear of the tower walls on all sides, and, if possible, there should be room to walk all round it. In the case of a wooden frame, the foundation beams must not be built direct into the tower walls, but be anchored to heavy cast-iron shoes embedded in the walls, affording an air space to all the wooden surfaces except the bed. The rolled steel foundation beams of a metal frame should have a 12 in. bearing on a 6 in. thick template, for which reinforced concrete is more suitable than stone. The joist-ends should be encased in strong cement concrete to give a 4 in. cover, but to case their entire length is not only costly but makes the fitting of the superstructure difficult. If it is desired to make these beams act still more as ties, phosphor-bronze or " delta " bolts may be fitted to the ends and carried to within a few inches of the outer wall face.

And in Steel

The section shows the best form of foundation for a frame. It is anchored to the walls at twelve points, and makes the tower and frame one unit, greatly strengthening the former and being, at the same time, a sound engineering job. The beams are bolted together at each point of intersection, and the four upper

ones are cross-braced. Rivets are, of course, better than bolts wherever possible. Diagonal beams, set across each corner, have been advocated, but entail a lot of additional steel, and, in practice, are no better than the standard plan.

If it is desired that the foundation for the bell-frame should take the form of a reinforced concrete floor, the aggregate should be the best of the new insulating kinds at present being experimented with ; ordinary ballast (or even brick) aggregate should not be used. Where the edges are bedded into the wall, there should be a special sound-insulating wallplate.

Rigidity Essential

It used to be considered in some quarters that the foundation beams of a bell-frame should be springy, but it has been proved by exhaustive scientific experiments that, in addition to the tower itself acting like a spring, the stresses in a springy frame may be cumulative, but not cumulative in a rigid frame. In any case, bells in a springy frame never " go " well, and are, therefore, seldom rung. The spring in the tower cannot be helped, but the frame, at least, should be as rigid as possible.

Lowside Frame

Unless there has to be a " rider," as previously discussed, the cast-iron frame should be of the lowside pattern as it is easier to get round the bells for oiling, roping, and other adjustments than with an " H " frame. Moreover, a lowside frame has less tendency to rock than an " H " frame. The plan shows the most economical arrangement for an eight-bell frame, where the tower is reasonably stiff in both directions ; and the foundation beams are calculated for a peal having a 20 cwt. tenor and for a span of 18 feet. Many western towers have a wide and lofty arch in both east and west walls. In such cases it is advisable to swing all the bells east and west, provided that it is possible to rope all the wheels on the same side and yet be able to " draw " them into a suitable ringing " circle."

Canons

Bell-fittings do not greatly concern the architect except as regards the headstock and the bearings. The headstock of a modern bell, which is cast without canons, is an iron casting, having the correct curve for the " tucking-up " required. Mediæval bells, and all others down to about sixty years ago have canons ; they were fitted with elm headstocks cut away to accommodate the canons, which were bolted to the former, and had to withstand the entire leverage of the revolving bell. The men of old cast canons on their bells more because it was the only known method of attaching the bell to the headstock than for their graceful appearance. But canons are not mechanically sound, and the modern method is to bolt the flat crown of the bell direct to the headstock. However, it is desirable to retain the canons of a mediæval bell or of one of later date by a good founder. Discrimination should be exercised in this matter, and canons should not be retained where the conditions I have stated are not present.

Headstocks

Where the canons are retained, the headstock should be of elm, 6 in. thick for bells up to 12 cwts. and 8 in. thick up to 30 cwts. The 8 in. headstock is the better for being built up of four 2 in. thicknesses, as the laminations increase the strength and obviate the danger of warping. Sometimes cast-iron canon-retaining headstocks are fitted, though even then the canons are not used to secure the bell to the headstock. These are the least satisfactory of all bell-fittings. The additional counter-weight necessitates the bell being unduly " hung-out," and often affects the clappering, for the bell is apt to go up " wrong-side," and the steeple-keeper has to make his way among the up-turned bells (a dangerous job) and turn the clapper. In such cases, particularly for big bells, counterbalanced clappers are sometimes fitted, but then the clapper does not strike so good a blow, and some of the grandeur of a big bell is lost. The tenors at Yeovil and Mildenhall are examples.

Bearings

Ball-bearings are now almost universally preferred to the old-style plain bearings. It is essential that the type of bearing should be a complete ballrace which self-aligns itself in the outer ring. Any other type of ball-bearing causes bells to " fly," and makes them difficult to handle, particularly if there is a long draught of rope. Self-aligning bearings get over the difficulty, experienced in wooden frames, of the slight twisting of the upper members under varying conditions of humidity.

Recasting and Welding

A word about recasting. A mediæval bell, if cracked or dangerously thin, should be excluded from any rehanging scheme, and may suitably be preserved in some position within the church. The same applies to less ancient bells to which particular antiquarian interest attaches. In other cases a cracked or otherwise poor bell should be recast without canons. For very minor cracks, welding has been successfully resorted to, the normal tone of the bell being unaffected. The failures occur in the case of wider cracks, for in an alloy of which one constituent is very much more volatile than the other it is a tricky business, and the best welders will give no guarantee of success. It is often impossible to determine by inspection in the tower whether a bell is actually cracked or not, as the light is usually bad, and the crown is hidden by the headstock. As satisfactory rehanging can only be done at the foundry, the bells should be carefully examined when lying, stripped of their fittings, at the base of the tower before removal. There will then be no question of a crack being " discovered " after arrival at the foundry.

Retuning

Old bells are frequently retuned, and the result is always an improved peal, for modern founders tune their bells on scientific lines. But retuning of old bells can be carried to excess, and a decision should take into account the antiquarian as well as the musical view of the matter.

Estimates

It has usually been the practice to invite several firms of bell-hangers to inspect the bells and the tower, when rehanging is to be undertaken or a new peal installed, and to prepare their several recommendations and estimates. It follows that each estimate is based upon a different specification, which only an expert in bell matters can dissect and compare. Greater knowledge on the part of the architect will enable him to draw his own specification for the intended work, aided, it may be, by an independent consultant, to the end that all estimates are readily comparable, as in other building work.

Firms

There are now but three firms of bellfounders in the country, all of whom are doing first-class work. Their bells have individual qualities, but their hanging differs very little. In addition, there are perhaps half-a-dozen small firms of bellhangers who obtain their bells from one of the " big three." For the smaller jobs their work is adequate, and may be found cheaper than that of their big competitors.

Costs

In the matter of costs, a light chime of eight, hung " dead " and operated by hand-levers, in the key of A (when C=522), can be installed for about £700. A peal of eight ringing bells, tenor 10 cwts. in G, £1,100 ; the same number with a 20 cwt. tenor in E, £1,600 ; a peal of ten, tenor 30 cwt. in C, £2,200 ; or of twelve, tenor 40 cwts. in C, £3,000. The largest peal of ringing bells in existence is the twelve for Liverpool Cathedral (cast, but not yet hung), the tenor being 82 cwts.

This article is by no means exhaustive, for the subject is complicated and specialised, but I hope I have said enough to encourage the profession to approach bellwork not only from the architectural and antiquarian standpoint but also from that of the engineer and ringer, to the end that the belfry should not become a receptacle for exhibits better fitted for a museum.

Acknowledgment

My thanks are due to Mr. E. H. Lewis, M.A., President of the Central Council of Church Bellringers, and to Mr. A. A. Hughes, J.P., of Messrs. Mears and Stainbank, for invaluable suggestions from their long experience.

THE MONUMENTS OF CENTRAL ITALY

SECOND REPORT FROM CIVIL AFFAIRS DEPARTMENT OF THE WAR OFFICE*

June 6—July 18, 1944

Since the first official account of the condition of the monuments of Central Italy was issued, the Italian battle-front has moved steadily northwards. Field reports dated between 6th June and 18th July, now to hand, cover such centres of art as Perugia, Siena, Assisi, Spoleto, Orvieto and Viterbo, as well as a great number of smaller towns and isolated buildings.

Not including Rome, where war damage was limited to the relatively modern part of the Church of San Lorenzo, alongside the railway, and to a fifteen-foot stretch of the Aurelian wall, the " protected " buildings dealt with in the reports, i.e., buildings scheduled as being of primary importance from the point of view of architecture and art, number about 420. By far the greater proportion of these escaped injury, and there is no need to enumerate them here.

The major sites, containing eight or more important buildings, generally more familiar to English people, can be considered first ; fortunately such injuries as they suffered can be described very briefly.

In *Assisi* no damage was done at all. In *Siena* two churches of no artistic merit were wrecked, but of the 49 listed monuments nearly all were untouched, and only one, the Porta Romana, suffered at all severely. The Germans had planted mines in the city, but the plan of them was found and all were removed before any harm had been done. In *Perugia* the thirteenth-century bridge, Ponte San Giovanni, and the sixteenth-century bridge at Bastia were blown by the Germans and many houses in the suburbs were destroyed, but the old town with all its monuments and treasures escaped any serious hurt ; only one of its churches, that of S. Filippo Neri, which is not scheduled as an ancient monument, showing a crack in one wall. In *Orvieto*, a single bomb fell and destroyed one house ; everything else is intact. In *Spoleto* the damage was confined to broken windows, loosened roof-tiles, and (in the Pinacoteca) three fallen ceilings. *Viterbo*, on the other hand, suffered much damage. The Duomo escaped lightly, losing only windows and some plaster ; the church of the Trinità itself was not hurt, but the N.W. corner of its cloister was destroyed ; of San Francesco all but the apse was razed to the ground ; of San Giovanni in Zoccoli only the façade with its flying buttresses is preserved ; some mullions of the great rose window are hurt. Santa Maria in Spata is badly damaged, though the façade with its sculpture is intact ; San Pellegrino (not a listed monument) has lost its roof and its high altar ; the other churches are untouched or have suffered only minor damage, as has the Papal Palace. The (unlisted) seventeenth-eighteenth-century Palazzo Costaculti and the Palazzo Mezzatosta are much ruined, and a third part of the eighteenth-century theatre of Pio Nono was destroyed ; the Fontana della Rocca perished. The other Palazzi are all preserved, and the mediæval quarter of the town, San Pelegrino, suffered not at all and keeps its pre-war appearance.

Rieti, with its numerous fine churches and Franciscan monasteries, was untouched by war. *Montepulciano*, almost equally rich, escaped air bombardment, and the slight shell-fire directed at it caused little damage other than broken glass. The Duomo had one shell-hole through its façade and some small damage to its roof ; the Palazzo Communale and the Palazzo Ricci also were hit, but not seriously, and the damage could quickly be made good. The other five churches and three palazzi on the list, the museum and the picture-gallery, were all unharmed. In *Cortona* only one important building suffered, the Palazzo Pretorio, which was blown up by the Germans before they left. All the other monuments are structurally intact and the character of the town is unspoiled by war. In *Chiusi* one shell brought down a small section of the timbering and tiles of the Cathedral roof, damage easily repairable, and the Museo Etrusco received several hits and suffered severely ; no other monument was harmed.

Chieti was untouched. So, too, was *Aquila*, with its astonishing list of historic buildings. In *Tuscania* concussions had dislodged a few stones of the very fine church of San Pietro, which apart from that was intact ; the splendid Duomo and the other monuments of the town escaped all hurt. *Tarquinia*, with ten listed monuments, came out well ; the roof and the interior of the church of San Giovanni were injured and San Martino had a big hole in one side of the roof and some shrapnel scars on the north wall, and its campanile was hit ; the Palazzo Vitelleschi which housed the museum, was badly knocked about ; but the mediæval quarter of the town is in good shape and the Duomo, the fine church of Santa Maria in Castello, the other historic churches and the many towers, are all intact, and the famous Etruscan tombs have escaped damage.

The scheduled monuments in the smaller towns which are reported to have suffered structural damage are the following :—

TUSCANY

Arcidosso. The mediæval fortress, Rocca Aldobrandesca, had its interior damaged, but the outside, which forms the main interest of the building, is unchanged.

Asciano. The Collegiata church was shaken and the roof and south wall of San Francesco were damaged. One fine fourteenth-century house was destroyed.

Grosseto. The Cathedral cloisters were razed and the museum half ruined ; the main body of the Cathedral was unhurt. The Chelliana Library was wrecked (the best books had been removed).

Magliano in Toscana. The façade of the (abandoned) twelfth-century church of San Martino was hit in several places and the Campanile was half destroyed. The Palazzo dei Priori was shaken and shows cracks in its wall. The other monuments are unhurt.

Massa Marittima. Slight damage only to the church of Sant' Agostino. The lovely Duomo escaped with a mere shaking of the apse roof.

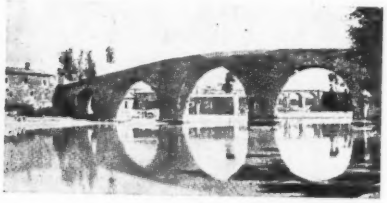
Paganico. The fine church of San Michele suffered, but not seriously ; three shell-holes in the roof can easily be repaired, and otherwise the building is in good condition.

Pienza. The Duomo suffered severely from artillery fire : the north window of the apse was blown in and its Gothic tracery destroyed, much of the apse roof was blown away, its outer masonry pitted with shrapnel, and five bays of the vaulting were badly holed. San Francesco had a large hole through the east wall ; there was slight shrapnel damage to the Palazzo Communale and the Palazzo Amanati ; but the damage is not such as really to impair the beauty of the little Piazza del Duomo, or Piazza Pio II, one of the finest small piazzes in Italy and most precious for its uniform grouping of early Renaissance architecture.

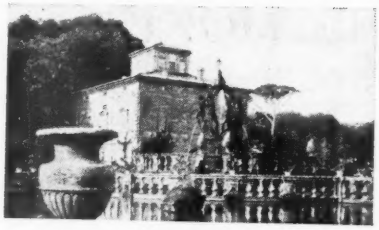
Radicofani. One big hole in the masonry of the façade is the only damage to the church of Sant' Agata ; but the early fourteenth-century church of San Pietro was badly hit, its campanile is in danger of collapse, as is the central vault, and most of the apse roof has gone ; fortunately the Della Robbia reliefs are all in good condition. The ancient clock tower was mined by the Germans and destroyed.

San Quirico d'Orcia. The fine main portal of the Collegiata church is undamaged, but there is some shrapnel pitting of the side portals and church walls ; the east end of the roof suffered,

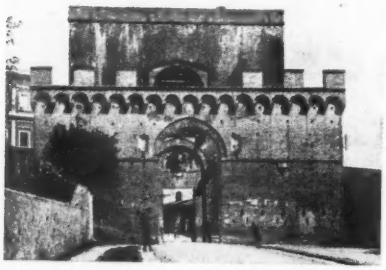
* *Received for publication from the Archaeological Adviser of the War Office.*



Ponte S Giovanni, near Perugia.

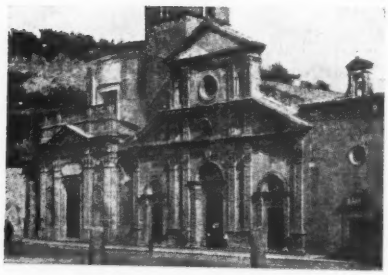


Bagnaia : Villa Lante.

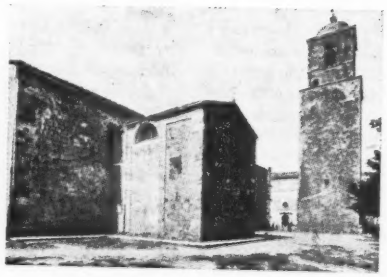


Siena : Porta Romana (from outside city).

Montepulciano : Cathedral.



Bolsena : S. Cristina.



Chiusi : Cathedral and Campanile.

Terni : Cathedral.

Left : Montepulciano : Palazzo Pubblico. *Above :* Cortona : Palazzo Pretorio. *Right :* Pienza : Piazza del Duomo, with Palazzo Pretorio *or* Communale.

much of the baroque plaster work of the choir has fallen (it was in course of removal in any case) and the fine intarsia stalls are exposed to the weather. The Chigi palace is in a bad state from shell-fire, bombing, and sacking by German soldiers.

UMBRIA

Foligno. The Germans made elaborate arrangements to blow up the centre of the town, including the Cathedral, but did not have time to complete the work. But already, considerable damage had been done to the monuments by bombing. The Cathedral was twice hit ; one bomb exploded in the crypt, destroying practically the whole floor, and one just outside the south transept, which is in a dangerous condition ; the Romanesque façades of the north transept and of the west front are undamaged. Repairs are already in hand. The Nunziatella church was completely ruined. The Palazzo Trinci received a direct hit which greatly damaged the fifteenth-century part, but without immediate harm to the frescoes.

Terni. The Cathedral suffered severely ; the interior is all damaged by blast and the parts of the vault which have not already collapsed were reported to be unsound. The necessary first-aid measures were taken in hand at once. The church of S. Salvatore, artistically more important, is unhurt.

LAZIO

Acqua-pendente. The upper church of S. Sepolcro is in a bad state with its Romanesque portal destroyed, its roof gone and most of the stucco decoration fallen ; only the Della Robbia on the wall is intact. Fortunately the older lower church, which is of greater interest, is intact.

Alatri suffered from bombing, shell-fire and German mines. The eighteenth-century campanile of the Cathedral was hit by numerous shells and is in a dangerous condition. The fourteenth- or late thirteenth-century church of Sta. Maria Maggiore also threatens collapse, all the vaults being cracked and one wall weakened by bombing. The fourteenth-century San Silvestro was badly smashed by bombs : only the frescoed walls remain and of them the western façade is likely to fall.

Albano. The Romanesque church of San Pietro has a huge hole in its roof, but is otherwise structurally sound.

Ariccia. The Chigi palace was damaged by bombing and was also sacked by the Germans, but only the roof and a secondary staircase were actually destroyed.

Bagnaia. The Villa Lante (fifteenth-sixteenth centuries) received some damage from bombs ; more was done by German looting.

Bolsena. The campanile of Santa Cristina was hit by a shell and half of it came down, making a large hole in the church roof and damaging the west end ; the façade of the church has some pitting of shell-fire.

Civitavecchia. Michelangelo's Fort is in a bad state ; the N.E. corner has fallen, the S.W. wall was badly bombed and the interior is much wrecked, the back of the polygonal tower is blown out.

Ferentino. The north side aisle of the Cathedral was holed by a shell and the roof shaken, but this important church with its twelfth-century mosaic pavement, pulpit and choir screen, is not seriously damaged. It was under restoration at the outbreak of war. The Romanesque Gothic (thirteenth century) church of Sta. Maria Maggiore had its roof jarred and its cupola cracked by a near miss, but is in no danger ; its fine portal is intact.

Subiaco. In the First Cloister of Santa Scolastica one side, with the wing behind it, received two bomb hits and was almost totally destroyed : it was a modern construction of no particular value. The (old) second and third cloisters, the refectory, library and campanile are all intact, as is the Sacro Speco, which lost only the glass of its windows.

Sutri. The Cathedral had one chapel on the south side ruined by a bomb which fell just outside it. The Palazzo Communale, used as an ammunition dump, was burned by the Germans before they left.

Veroli was a good deal damaged by shell fire, but the harm to its monuments was slight. The church of Sant' Erasmo (thirteenth century, rebuilt in the eighteenth) received hits on three side chapels, the dome and the campanile, but repairs were started immediately.

ABRUZZI AND MOLISE

Avezzano. The Palazzo Torlonia, used by the Germans as headquarters, was heavily bombed and seriously damaged.

Popoli. The Romanesque façade which is the only important feature of the church of S. Francesco is intact, but the roof has suffered from concussion and there is interior damage. The Taverna Ducale, a fine example of fourteenth-century domestic architecture, has suffered minor interior damage, but the façade and main doors are unharmed.

As can be seen from the above detailed description, of the 420 important monuments under review, nearly 90 per cent. have suffered no hurt more serious than the breaking of window-glass ; of the 10 per cent. that have been actually damaged, only two or three are hopelessly destroyed and in many cases the damage can easily be made good. Considering the character of the fighting in this area, the loss to art is gratifyingly small.

MOSCOW PLANS

By ALEXANDER WERTH, B.B.C. and *Sunday Times* Correspondent in Moscow*

Those who have read the County of London Plan will probably have many queries in their minds about the frequent references in the book to Moscow rebuilding. We are now fortunate enough to be able to give excerpts from the recent broadcast report of Mr. Alexander Werth's interview with Mr. Pronin, Mayor of Moscow for six years, which gives a good idea of the future plans for the capital's reconstruction. Mr. Pronin has held one of the most responsible jobs in Russia, both before and during the war.

I've been here, said Mr. Werth, almost continuously since the very beginning of the war, and I've noticed a great many changes. Moscow to-day and Moscow in the spring of 1942 are two very different places.

Moscow's Town Hall is a famous eighteenth-century building of classical design, but the day I visited Pronin a fourth floor was being added to it, and the whole building is in the process of being completely changed and modernised. Pronin mentioned the reconstruction of this beautiful old building with a touch of regret and almost with an apology, but, he said, it didn't fit into the *ensemble* of Gorki Street, with its enormous blocks of modern buildings on either side, and he thought that in rebuilding Moscow it would be a mistake to be over-sentimental about old buildings.

Pronin took me into the next room, where the walls were covered with dozens of sketches and drawings of post-war Moscow. Here, for example, was a model of one of the new main avenues—the Leningrad Chaussee—running north-west from the centre of Moscow. Now it's only about one-third finished, but when it's completed it'll be a tree-lined avenue nearly four miles long, with eight and nine-storey blocks of flats on either side, and they're going to put up monumental Government buildings at the crossroads.

The general design of this new Soviet architecture is quieter and more sober than many buildings built here before the war, and the general effect is likely to be impressive, though you might argue on the exact architectural merits of individual buildings,

* To whom acknowledgments are made for permission to reprint parts of this Broadcast made earlier this year.

or even on their architectural distinctiveness. To define the post-war style of Soviet architecture is still very difficult, and Pronin admitted to me that no clear definition was possible yet. But the tendency is to incorporate classical rather than to build on purely modernistic lines.

There are many charming, if dilapidated, old stucco buildings in the narrow lanes of the Arbat area—the West End of old-time Moscow—and they'll have to go. But there are also ten or fifteen large buildings which need to be kept, but which will be in the way where they are now, and these, Pronin said, would be moved on rollers, as so many buildings in Moscow were moved before the war, for example, in the job of widening Moscow's main street—Gorki Street.

They are going to cut large avenues even through the poorer and shabbier parts of South Moscow, which are still largely composed of one and two-storey wooden houses. Altogether, the tendency in post-war Moscow will be, as far as possible, to eliminate small houses and to build blocks of flats instead. If small houses were allowed to multiply, Moscow, which is already large enough, would grow absurdly in area.

There'll be many new parks and gardens, and clean air is one of Pronin's principal aims. Moscow won't be a capital without industry, but there'll be a tendency to remove some factories rather than to bring in many new ones, and smoke-abatement rules will be very strict. Chemical and other "unhealthy" industries will be sent outside the city.

In this way the excessive growth of Moscow's population—and this is where the capital suffered so much from the housing point of view—will be kept under control.

When I asked Pronin if he thought the reconstruction of Moscow, or the rebuilding of large cities like Stalingrad, Kharkov, and others devastated by the war, would receive priority, he said he thought both processes would go on simultaneously.

As for transport—one of Pronin's proudest war-time achievements is the completion of two very long lines of underground railway. The underground network, including the whole of the inner circle linking up all of Moscow's termini, would be greatly increased, he said, after the war, and that would get rid of the present congestion.

Although he agreed the overcrowding of tramcars was, and always had been, extremely bad in Moscow, he was against scrapping them; but he thought they'd gradually be eliminated in the centre of the town, where trolley-buses would take their place. He doubted whether motor-buses would be adopted on a large scale, and he didn't seem convinced by Britain's experience in this matter.

Another great Moscow innovation after the war would be the building of many new cinemas, the present cinemas mostly being very small and uncomfortable.

Mr. Pronin concluded: "... We shall make Moscow a beautiful capital worthy of our country. But for the war Moscow would have been a pretty wonderful place by 1947, when we were going to celebrate the city's eighth centenary. But by 1950 Moscow should be one of the finest capitals in the world.'

Book Reviews

Fine Building. By Maxwell Fry. VIII + 156 pp. + pls. London: Faber & Faber. 1944. 15s.

Architecture for Children. By Jane and Maxwell Fry. 177 pp. + pls. London: George Allen & Unwin, Ltd. 1944. 7s. 6d.

A comparison of these books is interesting because they cover almost the same ground, using some of the same illustrations. *Fine Building* is elegantly produced in the manner to which Messrs. Faber & Faber have accustomed us. *Architecture for Children* is a second-rate piece of book-production but is the better book. The former might be described as the Gospel according to Maxwell Fry, whereas the latter is his Shorter Catechism. The Catechism, opening with the challenge, "It is too cold for people to live out of doors all the time," confines itself strictly to a juvenile audience with only occasional lapses into jargon. *Fine Building*, written for the adult, has in its literary passages a more studied kind of simplicity which I found at times disconcerting, *e.g.*, the opening paragraph: "Little birds build their nests in fields and hedgerows in a tiny architecture immutably fixed in its material and form by the constant pressure of those natural forces that have controlled the destinies of little birds from the beginning of time." One is tempted to remark: "A little bird told me so!" The title of the book, *Fine Building*, seems to suggest some special refined sort of architecture, whereas in fact the book is most concerned with community needs, "the struggle of the English people to find their right way of living" and with the general problems of planning and reconstruction.

Admittedly there is a Chapter (V) which treats of "the architect's godlike task as a creator of beauty" and this appears to be at the core of the Gospel. It is a pity that the mantle of Ruskin should be assumed by no less a modernist than Maxwell Fry. "I am content," he says, "for the purposes of this presentation to accept the view that the final and loftiest purpose of architecture is to reveal the meaning of nature by displaying through the interplay of its materials, its surfaces and its volumes the idea of weight or gravity of cohesion and rigidity, of light, space and time. (See Schopenhauer's *The World as Will and Idea*)." I am quite prepared to see Schopenhauer. Schopenhauer and I often had a good old pow-wow in Lyons Corner House. It does seem that a hard day's planning drives the best architects to anæsthetics—I beg your pardon, æsthetics, with no more result than the conclusion that "Architecture like any other art is a mystery: there is no means of describing in words the real essence of the matter, however clearly it may be felt." (p. 115).

But to begin at the beginning. I didn't much enjoy, in Chapter I, being lectured about work, shelter, food, heat, cleanliness and health. "Shelter," the now inevitable portmanteau for castle-house-and-cottage, as well as the facts of life, are discussed with a disarming semi-scientific simplicity which made me rub my eyes and wonder if I had been aware of cold, fatigue and the kindred trials of civilised life.

Wonder turned to alarm when I was admonished: "First clean the air by ceasing to waste good coal in smoke ... let the clean sunlight in through large windows facing the sun ... let rents be low enough to enable *all* people to afford soap and hot water." (p. 17.) Having dealt me this deft blow Mr. Fry rallied me with the not very convincing conclusion: "If a house may be defined as an instrument for protecting life, then a town is an instrument for prolonging it." (p. 22.)

In Chapters II, III and IV Mr. Fry is on his home wicket. Chapter II deals with "the struggle of the English people to find their right way of living," and I was entertained by his account of the industrial era ("age of miseries and grandeurs"), his description of Kitty Wilkinson's bath-houses, Peabody tenements, Raymond Unwin ("Unwin's garden suburb at Hampstead, a creation as lovely as a mediæval carving"), the bye-law slums and the English town-planning Acts ("we have not even decided who is to plan"). Chapter III deals with the groundwork of reconstruction and here again the treatment is lively. He writes of worn-out areas, Kingsway replanned ("a magnificent shot in the dark"), Zoning ("a poor makeshift"), mass production ("what frightens me is the fear that it may be done badly and second-ratedly"), District Heating, the Garchy system of refuse disposal and Community Centres. Chaper IV is largely devoted to an account of the MARS plan for London. It is well presented with details of the Residential

Unit, the Neighbourhood Unit, the Borough or Town Unit and the City District, all culminating in the Great Metropolis. In these days when no town planner is acceptable without his green belt the authors of the MARS plan have provided themselves with a complete kilt. Fry waxes lyrical in his description of the parklands which are a feature of the plan: "flowing like tributaries into the greater lagoons of verdure separating the city units." Having lived for ten years in Park Crescent, at the apex of that existing parkland which he chooses as his example, I endorse the idea and his enthusiasm for it. "Now if you can imagine Regent's Park continuing in full width on to Primrose Hill, climbing the slopes of Hampstead, joining the Heath, and flowing on again into the depths of Hertfordshire, you will have an idea of the size of one of our parklands. If you see this space, not hemmed in by a ring of houses and buildings, but bounded by an indented coast-line of green estuaries and bays, up any of which you may venture; if you will imagine that this coast-line will vary like a low plain here, like a cliff there, or elsewhere a mixture of coastal plain and mountain, with at times some architectural promontory, or island advanced into the green sea, you will gain some impression of the city as you may one day see it from the parkland." (p. 104.)

I began by saying that I thought *Architecture for Children* was the better book. The title is not altogether happy. *Architecture for Children* might be thought to deal with the design of schools and nurseries, whereas An Architecture Book for Children is intended. The book deals in five chapters with I. Building Needs, II. Living Spaces, III. How Buildings are Made, IV. The Art of Architecture, and V. How Our Forefathers Built. The style throughout is conversational and very readable and there is hardly any of the Mumbo Jumbo from the adult version, *e.g.* in *Architecture for Children* the Van Nelle factory is described as "a factory in reinforced-concrete, steel and glass showing what a pleasant place a factory can be," whereas in *Fine Building*: "As well might I have said before the transparent, elegant beauty of the Van Nelle factory, 'like as the day-spring from on high hath visited us.'"

I tried the book on my own thirteen-year-old, who enjoyed it and responded with enthusiasm to my questionnaire. He amplified his reading by describing reinforced-concrete as "concrete with a backbone of steel." He wasn't too sure about the comparison between the beauty of ships and houses. His comment was: "Pineapples and plums don't compare."

Looking at both books again, I could not help but feel that it is about time some of the illustrated examples were given a rest. I am tired of the end-view of Paimio sanatorium, the Central Square in Kharkov, the Penguin Pool and the Potteries (with smoke). I feel sure that, with his knowledge of contemporary architecture and planning, Maxwell Fry could have given us some less hackneyed examples, but one appreciates the difficulty of assembling such material in the middle of a blitz.

RAYMOND MCGRATH [*A.*].

PROGRAMMING AND PROGRESSING OF CIVIL ENGINEERING AND BUILDING CONTRACTS

The Ministry of Works has issued a pamphlet, *Programme and Progress* (H.M.S.O., 9d.), describing a method of programming civil engineering and heavy construction jobs at the start and of subsequently "progressing" the programme.

The importance of a considered programme is emphasised: unless the sequence of events in a contract is carefully thought out, and dovetailed together, at the very beginning, time and money will inevitably be lost. The meaning of programming and progressing is explained and simple illustrations show how a programme chart is prepared and how such a chart enables the programme to be easily adjusted to meet any unexpected contingencies that may arise.

Although the pamphlet does not do more than codify what is the best practice and experience, it is nevertheless an important document. Those responsible for the management of construction work should be familiar with such a programme and know how their own section of the work fits into the whole. In this way it is possible to see ahead the exact dates at which labour, plant and materials will be needed.

The Architect, Engineer, Contractor—or even the Owner—can use such a programme chart and see whether the work is going according to plan and, if not, what ought to be done to put things right. The pamphlet shows how a programme chart may be used for showing how the actual progress made each week compares with the planned progress.

The Advisory Council representing employers and operatives and the professional side of the Building and Civil Engineering Industries have considered and approved the charts and explanations and at the Council's request the Ministry is preparing similar charts for purely building and house building use.

Sound Transmission in Buildings: practical notes for architects and builders, by R. Fitzmaurice and W. Allen, of Building Research Station. 4to. 48 pp. 1940. Second Reprint. 1944. H.M.S.O. 4s.

Sound Transmission in Buildings—Practical Notes for Architects and Builders, by R. Fitzmaurice and W. Allen, of the Building Research Station of the Department of Scientific and Industrial Research, which was published just after the outbreak of war, has been reprinted.

The report deals with the way sound is transmitted from one part of a building to another, with the conditions relating to different types of occupancy, and with the new structural technique developed as a result of the joint research carried out for some years by the National Physical Laboratory and the Building Research Station. The technique is described and worked out in the form of examples for the design of flats and semi-detached houses. Problems of hospitals, office buildings and other dwelling-houses are also considered.

Copies of the report may be obtained from booksellers or from H.M. Stationery Office (York House, Kingsway, London, W.C.2), price 4s. (by post, 4s. 6d.).

An Example in Quantity Surveying, by Arthur J. Willis, F.S.I. 1. Dimensions and Commentary; 2. Abstract; 3. Bill. Three plans in 8vo portfolio. Published for author by Crosby Lockwood. 1944.

This example in its method of presentation is one of clarity, and for that reason alone should be of great assistance to a student of quantity surveying. The work is divided into three separate parts, dimensions, abstract and bill, together with drawings upon which the quantities are based.

The method consists in the dimensions being set out in numbered columns, and on the opposite page an explanation of each dimension. Each item of the abstract has the number of the column in the dimensions from which it is taken. It is thus an easy matter to follow the taking off from dimensions to bill by reference to the three parts of the example. The drawings are fully dimensioned with notes of the required materials and other necessary information. There is, therefore, little left to the imagination of the quantity surveyor, which is as it should be.

A careful study of this example by students is recommended, and a sub-title might well be Quantities without Tears.

C. W.

RECENT BRITISH STANDARD SPECIFICATIONS

The three following B.S.I. War Emergency Standards have been published:

B.S.I. 1093: 1944, **Pitch Mastic Flooring.** This is specification of an alternative to mastic asphalt for flooring, produced at the request of the Ministry of Works. Until recently no satisfactory material had been found to replace imported asphalt. Latterly tests on the use of coal-tar pitch have shown that it can be used to make satisfactory floors if the terms of the current specification are obeyed.

B.S.I. 1177: 1944 is for **Pitch mastic flooring incorporating lake asphalt,** and is intended as an alternative to B.S.S. 1903.

B.S.I. 1176: 1944, **Air drying black paint for cooking appliances,** has been prepared at the request of the Materials Standardisation Committee of the Ministry of Works.

The following is not a war emergency standard but one in the normal series:

B.S.I. 1175: 1944, **Sizes of stress graded softwood timber.** This relates only to dimensions of timber which have been graded in accordance with B.S. 940—Parts 1 and 2—1942. The range of sizes has been restricted to the minimum capable of meeting all normal requirements.

Wanted a plan! Post-war development! A report submitted by the Royal Australian Institute of Architects. 4to. 20 pp. 1944.

This is the Australian Institute's version of the R.I.B.A.'s Rebuilding Britain booklet and of others produced elsewhere by bodies concerned to propagate planning. It was prepared as a report for the N.S.W. Chapter and has been published by the Central Institute.

There are four sections on the "National Framework," Building Industry Operations, Codes and Standards and the Architect's contribution. Under National Framework the need for a National Plan is stressed in terms very much the same as those used in Britain. Emphasis is given to the need for control in the "use and treatment of all land"; there must be a stop to the alienation of Crown lands,

there must be organised training of planning personnel, planned decentralisation from larger cities and planned location of industry. In their plea for more planners they state inaccurately that "the British Government has already withdrawn nearly all town and territorial planners from the fighting forces."

Under Building Industry Organisation the report refers to the low efficiency of production in Australia: with a potential output of £666 millions they actually delivered only £261.5 millions between 1929-44. The report urges planned output with credit control and fixed priorities. A "Parliament" for the industry (e.g. an ideal B.I.N.C.) is suggested with labour properly represented. More scientific methods are needed in every section of the industry and new techniques must be studied.

Under Codes and Standards the Report recommends State codes with standing revision committees and proper inter-State liaison. Standards should cover neighbourhood, space and community factors; these are detailed at some length. In the last and shortest section, on the Architect's contribution, the claim is made that architects' services should be mandatory on all building projects as controllers in their undisputed field and as associates in their contributory field.

The pamphlet is clear and emphatic and should be useful. It is illustrated with rather slap-dash black and white drawings.

Water and Sewerage Survey by the National Federation of Women's Institutes. 8vo. 8 pp. 1944. 3d.

The primitive condition of water and sewerage services in English rural areas is an ugly sore hidden by the cloud of sentiment which attaches to the lovely English countryside. This short Report is a valuable and candid peep beneath the screen. The N.F.W.I. survey was made in 3,500 villages in every county in England and Wales; it does not claim to be statistically accurate and insufficient indication is given of the actual survey technique to enable an estimate of the degree of its accuracy, but the facts it reveals are grim enough even in isolation; presented as a substantial part of the whole picture of rural England they are a challenge we cannot neglect. In Frampton, Dorset, 50 out of 172 houses have bucket lavatories only. About 1,000 of the 3,500 villages have no piped water and, even where there is a supply, it is to stand pipes in the street and not into the houses; in Eastcombe, Glos., for instance, 39 out of 124 householders have to carry every drop of water more than 200 feet; 1,613 out of the 23,011 houses surveyed in Gloucester carry their water more than this distance. All the villages in Llandimore share one well which is covered by the sea at high tide and is ¼ mile down-hill from the village.

Twenty-six counties estimate that over half the houses surveyed have earth, bucket or chemical closets only. At the lovely village, Maiden Newton, in Dorset, six houses have to carry buckets from their closets 20 yards down the main roads to empty them on their gardens or allotments; 113 out of 163 houses have earth or bucket closets only. Over 50 per cent. of the village schools have earth or bucket closets only. These few facts only are an important small part of the rural housing problem which architects must help to solve.

The Practical Builder: A comprehensive and authoritative guide to the latest methods of modern building practice. Edited by R. Greenhalgh, A.I.Struct.E. 8vo. 448 pp. Odhams Press, 1944. 9s. 6d.

This is a handbook to current building technique in Britain written by seventeen authors under the general editorship of Mr. R. Greenhalgh, whose work as editor of one of the best building periodicals and author of several authoritative building books is well known.

Most of the authors are experienced in technical journalism and almost all are specialists of standing. The book seems chiefly to be written for the building and not the architectural student, but gives the latter no less than the former a useful panorama of the building process and much useful detailed practical information. The following are the chapter headings: Preparatory work by J. H. Bennetts, A.I.O.B.; Well Construction, by E. Lucas; Floors and floor finishings, by R. V. Boughton, A.I.Struct.E.; Roofs and roof coverings, by J. Millar, M.I.Struct.E.; Joinery, by E. E. Haycraft; Services by Eric Mitchell, A.R.I.B.A.; Mechanics, by C. A. R. Eslick; Painting and decorating, by J. B. Parry; Building materials, by W. Morgan, B.Sc.; Craftsmen's tools, by J. Millar; Draughtsmanship, by E. G. Mitchell; Estimating, by R. V. Boughton; Builders' business administration, by J. H. Bennetts; Technical training, by T. E. Scott, F.R.I.B.A.; Building Law, by W. T. Creswell, K.C.; Science and Building, by B. S. Townroe, Hon. A.R.I.B.A.; and Building and architecture, by Brian Peake, A.R.I.B.A.

Review of Periodicals

1943-44—IV

CIVIL, including CIVIC, MILITARY

OFFICIAL ARCHITECT, *1944 April, pp. 156-61:*
Tennessee Valley Authority: illustrations of dams in review of books on T.V.A.

BUILDING, *1944 July, pp. 172-7:*
Wiltshire County Council offices, Trowbridge, by P. D. Hepworth.

JNL., INSTITUTION OF CIVIL ENGINEERS, *1944 May, pp. 186-222:*
Birmingham civic centre (municipal building): the work of the architect and the engineer on a present-day building scheme; joint paper by T. C. Howitt [*F.*] and H. J. B. Manzoni, City Engineer, describing work in fulfilment of competition won by T. C. H., 1935. Illusd.

ARCHITECTURAL RECORD, *1944 May, pp. 58-70:*
Roosevelt Naval Base, Terminal Island, Long Beach, by Allied Engineers, Inc. Includes administrative bdg., recreation bdgs. (community centre), with gymnasium, open-air swimming pool, squash courts, club rooms, also dispensary and clinic.

ARCHITECTURAL FORUM, *1944 Mar., pp. 54-60:*
Fire stations, Canton, Ohio, by C. E. Firestone and L. J. Motter; and Farmington, Me., by A. J. Harriman.

ARCHITECTURAL RECORD, *1944 May, pp. 85-104:*
"Power plants." Building types study No. 89, illustg. power stations in U.S., with articles on design and planning by members of Albert Kahn, Inc.

COMMERCIAL

ARCHITECTURAL RECORD, *1944 Apl., pp. 95-112:*
Stores. No. 88 in Building types series. Projects for general store by Ketchum, Gina & Sharp; Drug store by J. G. Carr; Grocery store by A. G. Siple. Article, Materials and equipment for "chain" stores, by G. Schwartz. "Time-Saver Standard" for food store and pharmacy equipment.

ARCHITECTURAL FORUM, *1944 Mar., pp. 98-104:*
Office for an advertising agent, by Ketchum & Gina. Details of office equipment and furniture.

WERK (Zürich), *1944 Mar., pp. 85-8:*
Basel province cantonal bank by Frey & Schindler. Two-storey modern bdg. on open site.

JNL., ROYAL ARCHITECTURAL INSTITUTE OF CANADA, *1944 May, pp. 96-9:*
King Edward Av. building, Bank of Canada, Toronto, by Marani and Morris. Large filing, register and clearing house.

TRANSPORT

JNL., INSTN. CIVIL ENGINEERS, *1944 April, pp. 71-94:*
Engineering evolution of the London Passenger Transport Board, by V. A. M. Robertson. Railway siting, station design, etc.

ARCHITECTURAL RECORD, *1944 Feb., p. 71:*
Automobile service stations. Building types study. Illusd. examples and projects. Article on basic elements in planning, by G. J. Hemmeter, of Standard Oil Co. Time-Saver Standard sheets.

CALIFORNIA ARTS AND ARCHITECTURE (Los Angeles), *1944 Mar., pp. 32-6:*
Los Angeles airport. Project for post-war development by L. Aldrich, City Engineer, T. C. Austin and S. Spaulding, architects. Illusd. plans, views.

PROC., AMERICAN SOC. OF CIVIL ENGINEERS, *1944 Apl., pp. 565-78; June, pp. 943—:*
Military airfields. Paper by W. E. Howland and D. S. Jenkins on drainage. *Also* discussion.

INDUSTRIAL

PENCIL POINTS, *1944 Mar., pp. 36-55:*
Machine shop and assembly building for war factory, Maine, and Iron works by A. J. Harriman. Aircraft factory by Albert Kahn, Inc., and other war-time factories and factory offices.

ARCHITECTURAL RECORD, *1944 Apl., pp. 68-73:*
U.S. Naval Ordnance torpedo plant, Forest Park, Ill. Archts., Albert Kahn, Inc.

ARCHITECT AND BUILDING NEWS, *1944 July 14:*
The architecture of modern gasworks: article by J. B. Cooper [*F.*]. Illusd.

ARCHITECTURAL FORUM, *1944 Mar., pp. 109-12:*
Municipal asphalt plant, Manhattan. R. concrete bdg. of advanced design.

JNL., INSTN. OF ELECTRICAL ENGINEERS, *1944 May, pp. 177—:*
Windmills. Brief survey of the history and nature of millwrighting . . . by R. W. Murray. Illusd.

WELFARE (HOSPITALS, &c.)

HOSPITAL AND NURSING HOME MANAGEMENT, *1944 July, pp. 172-5 :*
Automatic temperature control in hospitals and nursing homes. "Sarco" thermostat system described and illusd.

JNL., AMERICAN INSTITUTE OF ARCHITECTS, *1944 Apl., pp. 194-8 :*
Hospital design of to-morrow : article by A. Erdman.

PENCIL POINTS, *1944 Apl., pp. 40-76 :*
Hospitals number, illustg. F. D. Roosevelt Hospl., Bremerton, Washington, by Narramore and Associates, Grainger, Brady and Johanson, in collabn. with U.S. Public Health Service. Single-storey pavilion gen. hospl., inc. T.B. clinic. *Also* suburban hospl., Bethesda, Md., by Faulkner and Kingsbury ; 100-bed pavilion hospl., inc. clinics and health centre. *Also* University medical centre, Jerusalem, by Mendelsohn ; large gen. hospl. and school of nursing net yet completed. *Also* Assutah private hospl., Tel Aviv, Palestine, by J. Neufeld ; 120-bed general hospl. financed by 30 private practitioners. *Also* U.S. Public Health Service, Sheepshead Bay, N. York, by Hopkins and Associates. *Also* nurses' home and school, Bellevue Hospl., N. York City, by Hopkins and Associates. All well illusd. and briefly described.

WERK (Zürich), *1944 Apl., pp. 101-17 :*
The construction of modern hospitals. Paper to L'ATHÉNÉE of Geneva by H. Fietz. An important synopsis of knowledge on hospital planning, equipment, followed by descriptions and illustrations of the new buildings of the City Hospital, Basle, by E. and P. Vischer, H. Baur, Braüning, Leu and Dürig ; a modern building, including surgical, medical, operation and all normal depts. of large general hospital. *Also* the Canton Hospital, Zürich, by Arter and Risch, Haefli, Moser, Steiger and others (part completed). *Also* the Canton Hospital, Schaffhausen (illusd. model only). *Also* pp. xxxviii-xlv, notes on competition designs for Canton Hospital, Wintertur.

HOSPITAL AND NURSING HOME MANAGEMENT, *1944 May, pp. 105-8 :*
How Sweden provides for the sick : hospitals controlled by State and local authorities. Article by E. Hummelgren. Illusd. views Södersjukhuset, new municipal hospl., Stockholm, for 1,200 patients ; by H. Cederström. Carolinian and Södersjukhuset described.

HOSPITAL AND NURSING HOME MANAGEMENT, *1944 July, pp. 158-160 :*
New Kahler Hospital, Rochester, Minnesota, briefly described and illusd.

JNL., ROYAL ARCHITECTURAL INSTITUTE OF CANADA, *1944 May, pp. 102-7 :*
Mexico City Medical Centre. One of the largest groups in the world. Includes gen. hospl. for 1,200 beds ; 600-bed city emergency hospl. ; 2 maternity units of 200, 300 beds ; 300-bed infectious diseases hospl. ; 120-bed. cardiac institute ; 600-bed children's hospl. ; private clinic ; medical sch. ; dental college. The Centre links with 3 large provincial hospls. built and 8 others building. Parts of Centre already built illusd. by photos, other parts by models and drgs.

HOSPITAL AND NURSING HOME MANAGEMENT, *1944 April, pp. 76-8 :*
Prince Henry's Hospital, Melbourne, Australia, by Leighton Irwin. Gen. view, ward plan and short description.

AIR TREATMENT ENGINEER, *1944 July, pp. 100-3 :*
Modern hospital engineering practice ; article by F. J. Buckley.

BUILDER, *1944 June 30, pp. 518-21 :*
Guy's Hospital, London, York clinic for psychological medicine by W. J. Walford [*F.*] and J. M. Easton [*F.*]. Wards, recreative rooms and clinical provision for 43 patients. Illusd. plans. All types "nervous" ailments short of insanity.

PENCIL POINTS, *1944 Apl. :*
Cleveland County Health Dept. (small clinic), Norman, Oklahoma, by H. L. Kamphoefner.

WERK (Zürich), *1944 Mar., pp. 89-92 :*
Private sanatoria at Davos and Wintertur. Old buildings modernised by R. Gabarel. Illusd.

JNL., INDIAN INSTITUTE OF ARCHITECTS (Bombay), *1943 Oct., pp. 34-7 :*
Shri Padmavatidevi Tuberculosis Hospital and Sanatorium, Baroda, by M. K. Jadhav [*A.*], State architect. Full description and illusns.

HOSPITAL AND NURSING HOME MANAGEMENT, *1944 June, pp. 141-4 :*
State tuberculosis sanatorium, Borneville, Arkansas, U.S.A. Illusd. and described (no plan).

ARCHITECTURE ILLUSTRATED, *1944 Mar., pp. 35-9 :*
Queen Elizabeth Home, the Heritage Craft Schools and Hospital, Chailey, by L. K. Hett [*F.*].

ARCHITECTURAL REVIEW, *1944 April, pp. 106-8 :*
Day nursery, Rio de Janiero, by Oscar Niemeyer.

JNL., ASSN. OF ENGINEERS AND ARCHITECTS IN PALESTINE, *1944 Mar.-Apl., pp. 4-5 :*
"Village of work" in Valley of Sharon, reformatory and educational establishment for 90 boys of 14-18 years of "particularly intractable character." Architect, A. Sharon.

PUBLIC RESORT (PUBLIC HOUSES, BATHS) ; RECREATIVE (COMMUNITY CENTRES, &c.)

ARCHITECT AND BUILDING NEWS, *1944 June 30, pp. 198-9 :*
The pub. and the architect. Article by H. B. Creswell.

EDUCATION—SCHOOL CONSTRUCTION SUPPLEMENT, *1944 April 28 :*
Swimming bath, Univ. College, Swansea, by Percy Thomas [*F.*]. Illusd. and described.

SCOPE, *1944 June, pp. 27-31, 50, 52, 54 :*
"Holidays with pay." Article on W. E. Butlin, promoter of holiday camps.

BUILDING, *1944 July, p. 195 :*
Open-air bandstand, Midland, Michigan, by Alden Dow. Photo.

ARCHITECTS' JOURNAL, *1944 April 6, pp. 263-6 :*
Tennis and exhibition hall, Amsterdam, by A. Boeken. Illusd. and described.

S. AFRICAN ARCHITECTURAL RECORD, *1944 Mar., pp. 64-79 :*
City Hall : research and programme for design of hall for Cape Town. Detailed schedule of accommodation.

AMERICAN CITY, *1944 Mar., p. 52 :*
Open-air theatre, Red Rocks, Denver, Colorado. "Natural" auditorium on large sloping rock face. Illusd.

WERK (Zürich), *1944 Feb., pp. 38-52 :*
Stage design : illusd. articles on modern design in Switzerland.

HEATING AND VENTILATING ENGINEER AND JNL. OF AIR-CONDITIONING, *1944 April, pp. 399-404 :*
Heating and ventilating of cinemas, by L. W. J. Henton, of Gaumont-British.

ARKITEKT (Istanbul), *1943 No. 11-12, pp. 246-7 :*
Sports stadia in Turkey. Exhibition of models.

ARCHITECTURAL FORUM, *1944 Apl., pp. 141-4 :*
Recreation centre for Kansas City factory zone. Community centre, open-air theatre.

ARCHITECTURAL FORUM, *1944 Apl., pp. 89-94 :*
Rural activities centre, T.V.A. Project by Wank & Bianculli for recreative centre in connection with one of 800 electric power co-operatives. Inc. community centre with covered and open theatre, day nursery, meeting rooms, etc. ; demonstration farm of 200 acres (plan and drg. of bdgs.), housing.

PENCIL POINTS, *1944 Feb., pp. 37-52 :*
Community centres in U.S. at Cabrillo Homes, Long Beach, Calif., by W. L. Reichardt ; single-storey timber centre for 600 dwellings ; Smith Creek village, Apalachia Dam, T.V.A., by R. A. Wank, small centre with general store for community of 20 families. Also school, market, administrative and community buildings in the Oregon-Washington area.

ARCHITECTURAL REVIEW, *1944 May, pp. :*
Social centre, sports and country club, Belo Horizonte, Brazil, by O. Niemeyer ; advanced modern structure and plan.

ARCHITECTURAL FORUM, *1944 April, pp. 59-66 :*
U.S. Air Corps community building and officers' club, MacDill Field, Florida. Open-air band stage.

EXHIBITIONS ; MEMORIALS

BUILDER, *1944 July 7, pp. 5-7 :*
Exhibition hall for Edinburgh ; project by D. H. Harrison, E. Seel and T. M. Cartledge. Illusd. model.

ARKITEKT (Istanbul), *1943 No. 11-12, pp. 241-5 :*
Izmir international exhibition : general descriptn. and illusns. of Hungarian, Bulgarian and Palestine pavilions.

JOURNAL, ROYAL SOCIETY OF ARTS, *1944 June 9, pp. 322-40 :*
Conference on war memorials. What form shall they take ?

RELIGIOUS

ARCHITECTURAL RECORD, *1944 Feb., pp. 66-8 :*
Chapels (Protestant and R.C.) for U.S. Naval Air Station, Jacksonville, Fla., by Robert & Co., Architects.

BUILDER, *1944 April 21, pp. 316-8 :*
Chapel (temporary) at Lambeth Palace, by N. F. Cachemaille Day [*F.*].

BUILDER, *1944 April 7, pp. 274-6 :*
Church building in S. Africa : Sir Herbert Baker's reminiscences. Paper to Ecclesiological Soc.

HEATING AND VENTILATING ENGINEER AND JNL. OF AIR-CONDITIONING, *1944 April, pp. 389-90 :*
Heating and ventilating churches. Section in Design factors article, by H. Swaine.

JNL., RYL. ARCHL. INSTITUTE OF CANADA, *1944 Apl., pp. 79-83 :*
Romanticism and Protestant church architecture : article by E. W. Hounsom. Illusd. by author.

JNL., ROYAL ARCHITECTURAL INST. OF CANADA, *1944 Mar., pp. 45— :*
Protestant Church architecture in Canada. Articles on church

archre., symbolism and various arts, also planning for the organ and lighting.

EDUCATIONAL (general)

ARCHITECTS' JOURNAL, *1944 June 8, pp. 439-40 :*
Educational buildings. Paper to W. Yorks Soc. Archts. by P. B. Haswell [*A.*], Archt., Leeds Education Ctte.

SCHOOLS

ARCHITECTS' JOURNAL, *1944 June 8, pp. 431-6 :*
Bromma High School, Stockholm, by P. Hedquist, for 1,000 pupils. Eriksdal School, Stockholm, by Ahrbom and Zimdahl, for 2,000, with large gymnasium and concert halls.

ARCHITECTURAL REVIEW, *1944 June, pp. 144-8 :*
Northern High School for Girls, Stockholm, by N. Ahrbom and H. Zimdahl. Illusd. and described.

ARCHITECTURAL REVIEW, *1944 July, pp. 19-20 :*
Southern Communal School, Stockholm, by Paul Hedquist. Illusd.

ARCHITECTURAL FORUM, *1944 Apl., pp. 97-102 :*
Public school system for Delano, Calif., by E. J. Kump Co. Community planning and school provision. Typical classroom unit illusd., and plan for indoor and outdoor activities.

BUILDING, *1944 June, p. 164 :*
Standard construction for schools : critical review by J. R. Leathart of Post-war building study No. 2.

EDUCATION, *1944 June 30, pp. 805-6 :*
Lighting of schools : extracts from paper by W. T. F. Souter on lighting of public buildings read to Illuminating Engineering Socy.

ARCHITECTURAL RECORD, *1944 May, pp. 75-84 :*
Sixteen ways of daylighting classrooms, by D. Haskell. Sections of classrooms indicating various roof and window schemes and daylight qualities for various orientations. Also summary of daylighting factors and scheme for graphic estimating of daylight.

ARCHITECTURAL RECORD, *1944 Apl., pp. 90-2 :*
Designs for elementary school for 200 boys, 8-12 yrs. Awarded prizes in competition set by Hudnut for Beaux Arts Inst. design.

ARCHITECTURAL FORUM, *1944 Mar., p. 63 :*
Prefab. nursery school by Holden, McLaughlin & Assoc. for American Women's Voluntary Services. Photos, plan.

ARCHITECT AND BUILDING NEWS, *1944 June 30, pp. 196-7 :*
Nursery school for children of workers in Kaiser shipyards, Richmond, Calif., by M. Wortman.

BUILDING, *1944 April, pp. 110-1 :*
Mixed senior school. Project by Yorke & Breuer.

ARCHITECTURAL REVIEW, *1944 April, pp. 91-3 :*
Senior elementary school, Our Lady of Lourdes, Southport, by F. X. Velarde.

TECHNICAL SCHOOLS

ARCHITECTURAL REVIEW, *1944 April, pp. 94-7 :*
Stockholm Trades School and Fredhäll elementary school, Stockholm, by Paul Hedquist.

MUSEUMS ; GALLERIES ; LIBRARIES

MUSEUMS JOURNAL, *1944 April, facing p. 8 :*
Geological museum : plan of a proposed geological gallery.

MUSEUMS JOURNAL, *1944 May, pp. 17-21 :*
The historical medical museum : its future and possibilities, by Dr. S. H. Daukes, Director, Wellcome Hist. Med. Mus., with plan of proposed gallery.

BUILDING, *1944 July, pp. 185-9 :*
Avoidance of reflections in picture glazing, by J. H. Markham [*F.*]. Gallery lighting, theory and practice.

ARCHITECTURAL FORUM, *1944 Mar., pp. 106-8 :*
Industrial design studio, Libbey-Owens-Ford Glass Wks.

LIBRARY ASSOCIATION RECORD, *1944 July, pp. 117-9 :*
The Lenin State Public Library, Moscow, described by N. Karklin. Illusd.

BROADCASTING STUDIOS ; SOCIETIES' BUILDINGS

ENGINEERING NEWS-RECORD, *1944 Apl. 13* (News Issue), *p. 11 :*
Television broadcasting. Model of studio prepared for G.E.C. by Austin Co. for mass production and distribution. R. Smith, archt.

NUESTRA ARQUITECTURA (Buenos Aires), *1944 Mar., pp. 78-91 :*
Hebrew Society of the Argentine Social Club, by G. Y. J. B. Joselevich. Large club, inc. theatre for 350 seats, library, gymnasium, swimming bath.

DOMESTIC (general)

ARCHITECTURAL RECORD, *1944 Feb., pp. 50-3 :*
" Pressure planning," by Joseph Hudnut. Article critical of housing and planning promoted by finance groups, *e.g.* Stuyvesant City, N. York.

ARCHITECT AND BUILDING NEWS, *1944 April 14, p. 26 :*
Bungalow for aged people. Project by E. Atherton [*A.*].

ARCHITECTURAL FORUM, *1944 Mar., pp. 77-82 :*
Insolation and house design. Article by George Keck, illusd. by Keck house for H. M. Sloan, Chicago. Details of shutters and louvered windows.

ARCHITECTURAL FORUM, *1944 Feb., pp. 69-74 :*
Planning the post-war house, 2. Materials and equipment. Kitchen storage.

JNL., INSTN. OF MUNICIPAL AND COUNTY ENGINEERS, *1944 April 4, pp. 357-64 :*
Planning the home. Report of meeting at I.C.E. and I.M. & Cy.E. exhibition. Contributions by Manzoni, City Engr., Birmingham; Gibson, City Archt., Coventry ; Miss Upcott, Pres. Soc. Women House Managers.

HOUSING

JOURNAL, ROYAL SANITARY INSTITUTE, *1944 July, pp. 139-48 :*
Housing and town planning, by Ernest Minors, Boro' Surveyor, Darlington.

BUILDING, *1944 May, p. 129 :*
Experimental houses erected by Min. Works at Northolt : short note and drawing by P. D. Hepworth [*F.*].

ARCHITECT AND BUILDING NEWS, *1944 May 19 ;*
ARCHL. DESIGN AND CONSTRN., *June ;*
BUILDER, *May 12, pp. 383-4 :*
Experimental houses for Birmingham. Light steel frame with temporary or permanent covering ; can be prefab. or not. Described and illusd. progress photo and plans. H. J. Manzoni, engineer.

ARCHITECT AND BUILDING NEWS, *1944 May 26, pp. 122-6 ;*
ARCHITECTS' JOURNAL, *June 22 ;*
ARCHL. DESIGN AND CONSTRUCTION, *July, pp. 150— ;*
BUILDER, *May 19, pp. 401-4 :*
Experimental houses at Coventry using " Unibuilt " method of light steel frames and variable external and internal facing (model built uses asbestos cement externally, plasterboard internally). Consulting architects G. G. Wornum [*F.*] and R. H. Sheppard [*A.*].

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 April, pp. 89-94 :*
Housing and rehousing schemes for Liverpool and Leicester, reviewed by E. Neel [*A.*]. Fully illusd. Terraces, flats, neighbourhood units.

ARCHITECTURAL FORUM, *1944 Apl., pp. 66-70 :*
Chicago Housing Conference. Brief report, with Housing principles for U.S. proposed by J. H. Blandford.

ARCHITECTURAL FORUM, *1944 Mar., pp. 75— :*
T.V.A. sectional houses : fully illusd. article on structure and plans.

ARCHITECTURAL FORUM, *1944 Mar., pp. 65-74 :*
Channel Heights housing project, San Pedro, Calif., by Neutra. The most important of his recent works. 165 acres developed as housing site at 3.6 families per acre in semi-detached one- or two-storey houses. Careful orientation. Scheme incs. Nursery school, community centre, market and store. Well illusd., briefly described.

OFFICIAL ARCHITECT, *1944 April, pp. 162-71 :*
New Zealand housing. Flats in Wellington and small houses by Govt. Dept. Housing.

JOURNAL R.I.B.A., *1944 June, pp. 191-7 :*
Social survey technique of obtaining housing information. Paper at R.I.B.A. Archl. Science Board mtg. by Dennis Chapman, Senior Research Officer, Ministry of Information War-time Social Survey.

ARCHITECT AND BUILDING NEWS, *1944 June 23, pp. 182-5 ;*
ARCHITECTS' JOURNAL, *June 29, pp. 492-4, xxx ;*
BUILDER, *July 7 and 14 ;*
JOURNAL R.I.B.A., *1944 June, pp. 198-203 :*
Science and housing. Paper at R.I.B.A. Archl. Science Board mtg. by Anthony Chitty [*F.*].

SCOPE, *1944 May, pp. 23-27, 54 :*
" Factory-made . . . please ! " Article on prefab. houses and production in Britain framed round biog. article on B. Brunton, of Uni-Seco system.

ARCHITECT AND BUILDING NEWS, *1944 May 12 ;*
ARCHITECTS' JOURNAL, *May 11, pp. 344-6, 349-57 ;*
ARCHL. DESIGN AND CONSTRUCTION, *May ;*
ARCHITECTURAL FORUM, *June, pp. 90-6 ;*
BUILDER, *May 5, pp. 360-5 ;*
BUILDING, *May ;*
JNL., CHARTERED SURVEYORS' INSTN., *1944 June, 545-50 ;*
NATIONAL BUILDER, *May, pp. 200-203 :*
Ministry of Works factory-made steel-clad house (" Churchill House ") illusd. and described. Scientific design under supervision Dr. R. E. Stradling, F.R.S. Consulting architect, A. W. Kenyon. M.O.W. work directed by C. J. Mole, Deputy Director Wks. (J.C.S.I. :) By C. Chart [*L.*]. [Original design.]

BUILDER, *1944 May 19, pp. 397-8; May 26, p. 423:*
M.o.W. factory-made ("Churchill") house: alternative plans suggested by Dr. H. V. Lanchester [*F.*], Sir Arnold Thornely [*Ret.F.*], "W.H.W." and others. Also THE TIMES, 26 May.

ARCHITECT AND BUILDING NEWS, *1944 June 16, pp. 161, 170;*

ARCHITECTS' JOURNAL, *June 8, pp. 425-9; June 15, p. 447; June 29:*
M.o.W. house: further alternative plans.

ARCHITECT AND BUILDING NEWS, *1944 June 16, pp. 166-7;*

ARCHITECTS' JOURNAL, *June 15;*

ARCHITECTURAL DESIGN AND CONSTRUCTION, *June, pp. 132, 125-31;*

BUILDER, *June 9, p. 458:*
Ministry of Works emergency factory-made house: revised design. Illusd. (A.D. & C.:) preceded by fuller plans of first design.

ILLUSTRATED CARPENTER AND BUILDER, *1944 June 9, p. 630:*
M.O.W. emergency factory-built house. Letter from R. V. Boughton on costs.

ARCHITECTS' JOURNAL, *1944 June 22, pp. 460, 463-6:*
Ministry of Works emergency factory-built house criticised and compared with T.V.A. mobile and demountable houses. Illusd.

ARCHITECTS' JOURNAL, *1944 July 13, pp. 22-6, 33-6:*
Prefabricated, temporary, mobile houses. Further discussion round Portal House, incl. illus. caravan house by A. Wise, and steel and timber prefabd. house in Sweden by E. Friberger.

BUILDING, *1944 May, pp. 130-5:*
Shop production and house design: Article by W. Segal on timber-frame houses. Illusd. details, isometrics, etc.

WOOD, *1944 May, pp. 102-4:*
The "Seco" prefab. plywood house. Illusd.

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 May, pp. 105-7:*
Rural housing: Assessors' reports in Northants and West Wycombe competitions, including useful critical comments on agricultural workers' house needs.

BUILDING, *1944 April, pp. 98-103:*
"Thirty to the acre"; 3- or 4-roomed houses. Article and plans by W. & E. Segal.

BUILDER, *1944 June 16, p. 484:*
Agricultural workers' houses, nr. Bridport, Dorset, by R. Liddesdale Palmer.

GUILD OF BUILDING REVIEW (Hull), *1943-4, No. 19, pp. 4-8:*
War-time housing. Article by R. G. Clark [*F.*], illustrating Rural workers houses for Skirlaugh U.D.C.

GUILD OF BUILDING REVIEW (Hull), *1943-4, No. 19, pp. 9-19:*
"All this talk of reconstruction." Article by A. C. Light, Head, Hull School of Architecture. Housing demands, prefab., standardisation. *Also*, pp. 22-5, Hand- or factory-made houses; article by J. Konrad.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 2, pp. 8— :*
The development of mass house building. Article by M. Ginsberg on house types, accommodation, structure, cost and amenity in relation to emergency or temporary conditions.

FLATS; TOWN HOUSES (CONVERSION)

BUILDING, *1944 June, pp. 144-7:*
Balcony flats with spine access: plan and design analyses by W. Segal.

ARCHITECTS' JOURNAL, *1944 May 4, pp. 335-8:*
Flats and cinema, Stockholm, by S. Frölen. Details of entrance, windows, etc.

BUILDER, *1944 June 16, pp. 477-8:*
Utilising obsolete houses: article by H. V. Lanchester [*F.*] on conversion to flats.

CLUBS; HOTELS

ARCHITECTURAL RECORD, *Feb., pp. 55-9:*
Catholic seamen's institute, Brooklyn, by H. V. Murphy: club house with chapel.

BUILDER, *1944 May 26, p. 422:*
Holiday hotel ("holiday health centre") proposed for Ramsgate. Six bedroom blocks ("land-ships") connected with central restaurant, concert hall, gymnasium, etc. Archt., H. R. Steele [*F.*]. View and short description.

FARM BUILDINGS

JNL., CHARTERED SURVEYORS' INSTN. (Scottish Supplement), *1944 April, pp. 81-92:*
Scottish Committee on Farm buildings: Memo submitted by C.S.I. Dairy farms construction and equipment, machinery stores, etc.; piggeries.

COUNTRY LIFE, *1944 June 30, pp. 1122-3; July 7, pp. 28-9:*
The design of farm buildings: article by D. Walston on type of farm bdgs. suitable for modern farming technique, with large 3-storey barn to house equipment, dairy, storage, etc. In July 7, Dairy farms. Illusd. plans.

ARCHITECTS' JOURNAL, *1944 July 20, pp. 47-52:*
New trends in farm buildings, by Gerhard Rosenberg, A.M.T.P.I. Dairy farms, cowsheds, piggeries, grain driers. Tabulation of sizes of bdgs. and departments. Also, p. 54, notes from a paper by G— R— to Soc. of Chemical Industry (Agriculture Group) on Planning and equipment of farm buildings.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 3, pp. 14-19:*
Bungalow housing in rural "settlements" in the U.S.S.R. Article by M. Barsh illustrating new buildings for collective farmers, etc.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 3, pp. 30-3:*
Rehabilitation of collective farms in re-occupied areas. General site planning considerations. Article by K. F. Kniazev.

HOLIDAY HOUSES

ARCHITECTURAL FORUM, *1944 Apl., pp. 105-8:*
Desert housing project, Tuscon, Arizona. Holiday housing in health and beauty spot, by Brown, Faure, Drachman and Joynt.

ARCHITECTURAL FORUM, *1944 Feb., pp. 95-6:*
Ski-lodge, Peru Mountains, Vermont, by F. Dillmann; E. Durban, associate.

COUNTRY AND SMALL HOUSES

COUNTRY LIFE, *1944 July 21, pp. 112-3:*
"What will be wanted": discussion on post-war design of higher-income houses, by Robert Lutyens and C. Hussey.

ARCHITECTURAL FORUM, *1944 Feb., pp. 77-90:*
Four houses in California, by Paul Laszlo.

PENCIL POINTS, *1944 May, pp. 69-74:*
"Three levels on a N. Jersey hillside." House, Lanbertville, by Antonin Raymond, with equipment and furniture details.

ARCHITECTURAL RECORD, *1944 Feb., pp. 64-5:*
House near San Francisco, by W. W. Wurster for Mr. H. Timby.

PENCIL POINTS, *1944 May, pp. 36-58:*
Small, semi-luxury houses in U.S. by F. J. McCarthy, C. Fulkerson, L. M. Yost (architect's own home and studio), Rudolf Mock and Dion Neutra ("four-courter" house with wings separating four courtyards for social life, play, entry and service).

ARCHITECTURAL REVIEW, *1944 July, pp. 5-7:*
Two houses, Knoxville, Tennessee. Small luxury houses, by A. & J. W. Claus. Illusd.

DOMESTIC DEPENDENCIES

BUILDING, *1944 June, pp. 154— :*
The small house of the future: food storage, larders, pantries, plan and equipment analysis by A. Whittick. Illusd. J. Schreiner.

HEM I SVERIGE (Stockholm), *1944 No. 1, pp. 44-7:*
Front doors and entrance lobbies to small houses, inc. cloaks and toilet closets. Plan, details.

ARCHITECTS' JOURNAL, *1944 April 27, pp. 317-9:*
Canteen for factory, in Great Britain, by R. Frankel.

ARCHITECTS' JOURNAL, *1944 April 20, p. 294:*
Hatch and dining-table fitment for small flats and houses, by M. Mactaggart.

ARCHITECTS' JOURNAL, *1944 May 18, p. 366:*
Kitchen hatch and dining-table fitment. Design and letter by H. R. Humphreys. Illusd. (Following M. MacTaggart's scheme, 20 Apl.)

NUESTRA ARQUITECTURA (Buenos Aires), *1944 Mar., pp. 93-5:*
The kitchen of the future. Short illusd. article.

INTERIORS, DETAILS, CRAFTS, FITTINGS

WERK (Zürich), *1944 May, pp. 159-61:*
The principles of furnishing: article by H. Suter on room lay-out, furniture-window-door and service relationships. Illusd.

JNL. AMERICAN SOCY. ARCHITECTURAL HISTORIANS, *1943 Oct., pp. 32-48:*
The origin and distribution of the bulbous dome. Article by W. Born. Illusd., bibliog.

ARCHITECTS' JOURNAL, *1944 May 25, pp. 385-8:*
Analysis of textures by Cecil Stewart [*A.*]. Æsthetic of wall and other surfaces.

WERK (Zürich), *1944 Mar., pp. 69-79:*
New stained glass in Switzerland. Article by R. Hess. Illusd.

LITURGICAL ARTS (N. York), *1944 Feb., pp. 33-41:*
Heraldry in the Catholic Church, by W. W. Bayne, O.S.B.

LITURGICAL ARTS (N. York), *1944 Feb., facing p. 44:*
Altar in Catholic church at High Wycombe, by Eric Gill. Illus.

ARCHITECTURE (general)

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 July, pp. 160-6:*
"Child education: an organic approach to architectural appreciation at the Geffrye Museum, Shoreditch," by M. Harrison, Actg. Curator.

ARCHITECTS' JOURNAL, *1944 July 6, pp. 6-14 :*
Work of the Polish School of Architecture, Liverpool University.

THEORY

WERK (Zürich), *1944 Mar., pp. 97-100 :*
Space, Time and Architecture. Long critical review of Dr. Giedion's book, by Hugo Weber.

ARCHITECTS' JOURNAL, *1944 June 1, pp. 403-20 :*
"Visual planning"—planning for æsthetic effect. Historical survey and contemporary problem and possibilities. Article No. 35 in Physical planning series, by G. M. Kallmann and I. McCallum. Illusd.

ARCHITECT AND BUILDING NEWS, *1944 June 2, pp. 140— :*
The æsthetic aspect of civil engineering design. Paper by Dr. Charles Holden [*F.*] to Instn. Civil Engineers. Abstract.

PRESERVATION

ARCHITECT AND BG. NEWS, *1944 July 21, pp. 41-4 ;*
BUILDER, *July 14, pp. 23-5 :*
Preservation (of buildings) : lecture to Oxford Preservation Trust, by H. S. Goodhart-Rendel [*PP.*]. (Also corresp. in THE TIMES, June 26-July 21.)

BUILDER, *1944 June 23, pp. 498-502 :*
Royal Military Chapel, Wellington Barracks, built 1938, reconstructed by G. E. Street (1876-9) and new reconstn. started by H. S. Goodhart-Rendel [*PP.*].

COUNTRY LIFE, *1944 April 28, pp. 728-31 :*
Filkins, Gloucestershire. Cotswold village, home of Sir Stafford Cripps, restored and provided with "village centre" (community centre) and village museum. Architect, S. Roth.

HISTORY

ARKITEKT (Istanbul), *1943 No. 11-12, pp. 248-51 :*
The influence of European on American architecture. Article.

COUNTRY LIFE, *1944 April 14, pp. 640-3 ; Apl. 21, pp. 686-9 :*
Richmond Palace, Surrey, described by C. Hussey.

BURLINGTON MAGAZINE, *1944 May, pp. 119-24 :*
Palace of Charles V at Granada, designed by Machuca in mid-16th century. Described and discussed in detail by G. Loukomski. Illusd.

BUILDER, *1944 June 9, pp. 456-7 :*
Bricklayers' Arms station, Southern Railway. Note in connection with centenary of building, burnt down 1936, by Lewis Cubitt.

ARCHITECTURAL REVIEW, *1944 May, pp. 135-7 :*
"The stage groove and the thunder run." Article by R. Southern on 18th century stage mechanism found in Theatre Royal, Bristol.

ARCHITECTURAL REVIEW, *1944 July, pp. 26-7 :*
The Scott Memorial, Edinburgh, and its architect, G. Miekle Kemp. Article by W. Forbes Gray.

JOURNAL R.I.B.A., *1944 June, pp. 206-7 :*
Note on English church planning in the Middle Ages, by Helen Rosenau, Ph.D. Illusd.

ARCHITECTURAL REVIEW, *1944 April, pp. 99-105 :*
"The Cornish engraver." Article by Eric Brown and Enid Everard on lettering of Cornish tombstones.

BURLINGTON MAGAZINE, *1944 May, pp. 124— :*
Thomas White (architect), of Worcester. Note by M. Whiffen. Illusd.

ARCHITECTURAL REVIEW, *1944 June, pp. 142-3 :*
Rysbrack bust, "The aged Wren" so-called, identified by K. A. Esdaile as of Richard Miller, benefactor of St. Martin's-in-Fields Church.

ARCHITECTURAL REVIEW, *1944 July, pp. 21-3 :*
Blandford Forum, Dorset, built after fire by J. & W. Bastard in 1731—. Article by John Piper, particularly illustrating by Piper's drawings the colour values of the buildings and the general planning æsthetic.

ARCHITECTURAL REVIEW, *1944 April, pp. 86-90 :*
Canford Magna, Dorset. Lord Wimborne's model village, built c. 1846. Gothic revival houses with romantic rustic porches by John Hicks, thatcher, described and illusd. by drawings and photos by Barbara Jones.

ARCHITECTURAL REVIEW, *1944 June, pp. 149-56 :*
Fonthill Abbey (1791-1813) by James Wyatt. Critical and descriptive article by H. A. N. Brockman. Illusd. with front cover fantasy drg. by J. Piper.

ARCHITECTURAL REVIEW, *1944 July, pp. 2-4 :*
"In the modern Gothic manner," by Marcus Wiffon. Tetbury Church (1781). Illusd.

CUADERNOS DE ARQUITECTURA (Colegio Oficial de Arq. de Cataluna y Baleares) (Barcelona), *1944 No. 1, pp. 4-14 (new journal) :*
Architecture of the three first decades of the 20th century, by J. F. Ráfols. Illusd.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 3, pp. 3-7 :*
The democratic and all-national basis of Soviet architecture. Article by E. L. Mata, illustrated by 24 of principal Soviet buildings of past 10 years.

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 July, pp. 168-70 :*
Brick in Sweden. Note and photos by F. R. Yerbury.

OFFICIAL ARCHITECT, *1944 May, pp. 204-9 :*
Modern architecture in the Netherlands. Article by A. Schröder. Illusd., incl. illus. of terrace houses by Rietveld, planned during Nazi occupation.

ARCHITECTURAL VOCATION, PROFESSIONAL PRACTICE

JNL., INDIAN INSTITUTE OF ARCHITECTS (Bombay), *1943 Oct., pp. 27-33 :*
The architectural profession : status, code of practice, tasks, etc. : paper by N. K. Petigara, Public Prosecutor, Bombay, and long critical leading article, "The Institute and the profession : an indictment and a reply."

ARQUITECTURA (La Habana, Cuba), *1944 Feb., pp. 65-6 :*
The duties of architect and engineer.

PLAN (Architectural Students' Assn.), *1944 No. 2, pp. 4-7 :*
Bread and butter and architecture, by John Summerson (reprinted from HORIZON, 1942 Oct.).

PLAN (Architectural Students' Assn.), *1944 No. 2, pp. 9-11 :*
Private practice, groups or mass ? Analysis of possible organisation patterns for the profession, by F. W. B. Charles.

JOURNAL, AMERICAN INSTITUTE OF ARCHITECTS, *1944 May, pp. 211-5, 223-33 :*
Engineer and architect : papers by W. A. Delano, "A marriage of convenience," and by A. Embury, "Engineering and architecture."

ARCHITECTURAL ASSOCIATION JOURNAL, *1944 June, pp. 86-8 :*
Virtues and vices of architectural journalism. Discussion opened by J. Summerson.

BUILDER, *1944 April 21, pp. 319-22 ; April 28 :*
Professional and allied organisations in the building industry. List of bodies and addresses. [Now card-indexed in library.]

JNL., CHARTERED SURVEYORS' INSTITUTION, *1944 April, pp. 451-3 :*
Diagram to illustrate economic tendencies, by R. C. Treadgold. Cost of living, cost of building, rates receipts, indexes compared from 1914 to 1943.

ENGINEERING NEWS-RECORD, *1944 Apl. 20, pp. 103-226 :*
Construction costs in U.S. 1944. Detailed statement and analyses of costs of work, materials, wages ; contract prices, etc.

BUILDER, *1944 April 28, pp. 346-7 :*
Cost and quantities in building work : notes on the Report of Lord Portal's mission to U.S. to study building methods.

BUILDER, *1944 May 26, pp. 417-8 :*
Building costs between the wars : retrospective reflections by S. Hookway, F.S.I.

NATIONAL BUILDER, *1944 May, pp. 208-9 :*
War-time rise in building costs. Short analysis.

JNL., CHARTERED SURVEYORS' INSTITUTION (Scottish Supplement), *1944 April, pp. 57— :*
Building contracts : have we devised the best system yet ? by H. A. Brechin.

JNL., CHARTERED SURVEYORS' INSTITUTION, *1944 April, pp. 441-9 :*
Post-war problems for the Quantity Surveyor. Discussion meeting.

STRUCTURAL ENGINEER, *1944 April, pp. 168-72 :*
Professional engineer and architect registration laws in the State of Ohio, by Capt. C. M. Barber, U.S. Army.

ALLIED ARTS

ARCHITECTURAL REVIEW, *1944 June, pp. 164-7 :*
Design review : illusd. notes on some aspects of contemporary industrial design.

ARCHITECTURAL REVIEW, *1944 July, pp. 25-6 :*
Abstract painting and sculpture as an influence in industrial designing ; article in Design review illustrating work of Ben Nicholson, Naum Gabo, etc.

ARCHITECTURAL REVIEW, *1944 May, pp. 137-40 :*
Henry Moore's Madonna and Child sculptured group for St. Matthew's Church, Northampton. Illustrated and reviewed.

BUILDING (general)

BUILDER, *1944 April 28, pp. 335-7 :*
Building methods in America. Article on exhibition by M. of Works illustrating report of Lord Portal's mission. Illusd. Prefabrication, standardisation, modular design, demountable houses, housing.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 3, pp. 20-9 :*
The economics of construction using local materials. Long article by G. F. Kunetsov, with details of 16 types wall construction for houses. Comparative tables of transport costs, etc.

STRUCTURAL ELEMENTS

ARCHITECT AND BUILDING NEWS, *1944 April 21, pp. 49-50 :*
Soil stabilisation. Abstract of paper by H. E. Brooke-Bradley at Instn. Struct. Engineers.

PROCEEDINGS, AMERICAN SOCIETY OF CIVIL ENGINEERS, *1944 Mar., pp. 341-69 :*
Application of soil mechanics in designing building foundations, by A. Casagrande and R.E. Fadum.

ILLUSD. CARPENTER AND BUILDER, *1944 April 7, pp. 370-2 :*
Batters in brickwork : construction and costing of battered walls.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 2, pp. 21— :*
Centreless arch construction. Article by N. Kolli, illustrating various types for small spans and house designs using arch constn.

ARCHITECTURAL FORUM, *1944 Mar., p. 18 :*
Air-supported roofs : illus. of model of 1,200 ft. clear span dome.

PENCIL POINTS, *1944 Mar., pp. 79-80 :*
Rolling doors in shipyard by A. J. Harriman. Working details.

BUILDING OPERATIONS

ARCHITECTS' JOURNAL, *1944 April 20, pp. 304-6, xxxviii :*
New developments in the design of concrete form-work ; lecture at R.I.B.A. by C. Parry, M.I.Struct.E. *Also* leading article (p. 291), Concrete and texture.

JNL., INSTN. MUNICIPAL AND COUNTY ENGINEERS, *1944 May 2, pp. 411-22 :*
Mineral subsidence and local authority services, by T. McCallum.

BUILDING PRACTICE AND INDUSTRY

BUILDER, *1944 July 7, pp. 10-11 :*
Man-power structure of the bdg. industry : an objective analysis by H. C. Harland, F.I.O.B. War-time changes in personnel, etc.

BUILDER, *1944 June 16, pp. 485-6 :*
Welfare in the building industry : article by T. P. Bennett, lately Director of Wks., M.o.W.

KEYSTONE (Assn. Bdg. Technicians), *1944 April, pp. 7-8 :*
Time and progress schedules, by J. Pollock.

MATERIALS

SCIENTIFIC PROCEEDINGS OF ROYAL DUBLIN SOCIETY, *1943 Sept., pp. 164-70 :*
Atmospheric pollution in Dublin during 1942. Statistical report.

S. AFRICAN ARCHITECTURAL RECORD, *1944 Feb., pp. 41-5 :*
Building control investigation : 3rd rept. on research by Civil Engineering Dept., Witwatersrand Univ., on alternative materials for timber and steel.

PROCEEDINGS, AMERICAN SOCIETY OF CIVIL ENGINEERS, *1944 Mar., pp. 321-39 :*
Classified bibliography on the physical and mechanical properties of wood and the design and constn. of timber structures : progress rept. of the Cttee. of the Structural Division on Timber.

WOOD, *1944 May, pp. 99-101 :*
Wood as a causal factor in the corrosion of metals : article by W. G. Campbell and D. F. Packman, of Forest Products Res. Lab. Illusd.

PENCIL POINTS, *1944 May, pp. 79-84 :*
Plywood : article by L. Ottinger, President, U.S. Plywood Corpn., on manufacture and potentialities. Illusd.

ENGINEERING NEWS-RECORD, *1944 Mar. 23, pp. 104-8 :*
Rapid and simple concrete proportioning : article by L. D. Long, of Newark Testing Lab. " Empirical charts " for mixes.

ARCHITECTURAL FORUM, *1944 Mar., pp. 12-4 :*
Plastics, plywoods. Outline of possibilities in article " Materials for 194x."

PENCIL POINTS, *1944 Apl., pp. 79-80 and supplement :*
Sheathing : structural fibre insulating board ; first in new series of Don Graf information sheets on building products.

JOURNAL, INCORPORATED CLERKS OF WORKS ASSOCIATION, *1944 July, pp. 72-3 :*
Gypsum products for fire protection.

OFFICIAL ARCHITECT, *1944 June :*
Glass. Special no. Articles on making and qualities, use in building structure, decorative treatment. Illusd.

ARCHITECTS' JOURNAL, *1944 July 6, pp. 16-18, xxx :*
Some possible applications of aluminium alloys in building. Paper by E. G. West, Ph.D., and D. V. Pike, A.M.Inst.Struct.E.

CONSTRUCTION, including STANDARDISATION, PREFABRICATION

WERK (Zürich), *1944 Feb., pp. 65-7 :*
Standardisation in Finnish building. Reprint of article from ARKITEKTEN 1943, No. 5, on standard wood frame windows.

PENCIL POINTS, *1944 Mar., p. 74 :*
Design for prefabrication by C. A. Towne, Chief, Div. Recreation, Dept. Reg. Studies, T.V.A. Illusd. and followed note on demountable houses, Smith Creek, Apalachia Dam, T.V.A.

TECHNOLOGY REVIEW (Massachusetts Inst. Tech.), *1944 Mar., pp. 256-8 :*
Prescription for prefabrication by W. R. Rausch. General popular survey of possibilities.

NATIONAL BUILDER, *1944 April, p. 182 :*
Prefabrication : view expressed by Sir Malcolm Stewart, building industrialist.

ARCHITECT AND BG. NEWS, *1944 April 21 ;*
ARCHITECTS' JOURNAL, *April 27, pp. 321-34 and xxxiv ;*
BUILDER, *April 14, pp. 301-2 ;*
JOURNAL R.I.B.A., *May :*
Prefabrication. Rept. of talks and discussion at R.I.B.A. (A.J. :) full discussion.

ARCHITECTURAL FORUM, *1944 Feb., pp. 91-4 :*
Prefabrication. Hutments to houses. Peace-time house based on U.S. Navy " Quonset " hut. Semi-circular light metal rib frame, corrugated iron siding, insulation and masonite lining.

BUILDING, *1944 May, p. 128 :*
Prefabrication : the coming science. Short article by A. C. Bossom, M.P.

CONCRETE AND CONSTRUCTIONAL ENGINEERING, *1944 April, pp. 100-7 :*
The resistance of concrete to frost. Extracts from paper by A. R. Collins, A.M.Inst.C.E., on research at D.S.I.R. Road Research Lab.

CONCRETE AND CONSTRUCTIONAL ENGINEERING, *1944 June, pp. 158-63 :*
Concreting in cold weather. Reprint of article on run-way constn. from American Portland Cement Association publn.

ARCHITECTS' JOURNAL, *1944 April 6, pp. 269-70 ;*
JOURNAL R.I.B.A., *May :*
New developments in design of welded frames. Lecture at R.I.B.A. Archl. Science Board meeting by R. Moon, M.I.Struct.E.

KEYSTONE (Assn. Bdg. Technicians), *1944 May-June, pp. 9-11 :*
Pre-stressed concrete : comparison between theory of p.-s. concrete and ordinary r. c. design, by D. W. Brewster.

WERK (Zürich), *1944 Feb., pp. 53-64 :*
Timber building. Articles on timber bdg. illustrating dwelling and studio, Uerikon, by T. Schmidt, and, in article by Zeitschmann and Taesler, description and illus. Swedish building, incl. open-air bath, Stockholm, and " Eriksdahl " tennis hall, Stockholm, by Ahrbom and Zimdahl, " Element " prefab. modular system by E. Friberger, Göteborg ; Drachen Cinema, Stockholm, by E. Gronvall.

ARKHITEKTURA S.S.S.R. (Moscow), *1943 No. 2, pp. 26-30 :*
Lightweight pole constn. Article by C. Aizikovich on emergency structures of arched poles, thatched.

SANITARY SCIENCE AND EQUIPMENT

IRISH BUILDER AND ENGINEER, *1944 April 22, p. 166 :*
Mechanical services in buildings. Theoretical and practical aspects of heating and other installations. Paper by M. Jordan, A.M.I.H.V.E. to Instn. Civil Engrs. of Ireland, Dublin.

ARCHITECT AND BUILDING NEWS, *1944 April 28, p. 63 ;*
ARCHITECTS' JOURNAL, *May 25, pp. 394-5 :*
Sanitary technique in the design of hospital and domestic fittings. Chadwick Trust lecture at R. Soc. Tropical Medicine, by W. H. Hobday [*F.*]. (A. & B.N. :) reviewed by E. Gunn.

JOURNAL, ROYAL SANITARY INSTITUTE, *pp. 125-33, 148-55 :*
Rational design of house plumbing : article by A. Longworth. Sanitation in post-war building : article by H. J. Manzoni, City Engineer, Birmingham.

ARCHITECT AND BUILDING NEWS, *1944 June 2, pp. 141-2 ;*
BUILDER, *June 9, pp. 465-7 :*
Sanitation in post-war building. Paper by H. J. Manzoni, City Engineer, Birmingham, to Ryl. Sanitary Inst.

BUILDING, *1944 April, pp. 96-7 :*
Water-softening plant, S. Calif., U.S.A., by D. A. Elliot.

PROC. AMERICAN SOCIETY OF CIVIL ENGINEERS, *1944 Apl., pp. 457-519 :*
Advances in sewage treatment and present status of the art. 2nd progress rept. of the Ctte. of the San. Eng. Div. on sewerage and sewage treatment. Bibliog.

JNL., INDIAN INSTITUTE OF ARCHITECTS (Bombay), *1943 Oct., pp. 38-9 :*
Notes for drawing up general conditions and specifications for electrical installation by Elect. Contractors' Assn., Bombay.

PENCIL POINTS, *1944 Mar., pp. 56-61 :*
Industrial lighting practice. Article by C. I. Cady. Illusd. Fluorescent lighting, colour, intensities.

AIR TREATMENT ENGINEER, *1944 July, pp. 104-8 :*
Heating : past, present and future : first part, article by J. R. Kell. History from 1800.

ARCHITECTURAL FORUM, *1944 Feb., pp. 12-4 :*
Heating controls for post-war homes. Thermostatic controls.

ILLUSD. CARPENTER AND BUILDER, *1944 June 30, pp. 712-4 :*
Central heating for small houses : calculation of B.Th.U. requirements.

HEATING AND VENTILATING ENGINEER, *1944 May, pp. 421— :*
District heating and its economic relation to housing and town planning, by D. V. H. Smith. Detailed cost analyses.

A. & B.N. District heating and its economic relation.

PLAN (Architectural Students' Assn.), *1944 No. 1, pp. 5-8 :*
Coal economy and district heating by L. C. C. Rayner, B.Sc.

AIR-TREATMENT ENGINEER, *1944 May, pp. 74-6:*
Laid-on engineering services to satellite towns. Article by D. G. J. Matthews. District heating.

ARCHITECTS' JOURNAL, *1944 May 25, Information Sheet 939 :*
Domestic water heating and district heating. Lay-out and costs.

COUNTRY LIFE, *1944 April 7, p. 606 :*
"All-purpose" fireplace. Adaptation of domestic open hearth for cooking. Letter.

ARCHITECT AND BUILDING NEWS, *1944 July 7, pp. 11— ;*
BUILDER, *June 30, pp. 525— :*
"Fulham" open domestic grate for burning high-temperature coke.

ARCHITECT AND BUILDING NEWS, *1944 July 7, pp. 11-12 :*
Smoke-reducing domestic fires ; review of the "Fulham grate" by E. Gunn.

BUILDING, *1944 April, pp. 92-3 :*
Planning the house for cleanliness, by A. Whittick. Garchey system refuse disposal.

PROOFING

JNL., INDIAN INST. OF ARCHITECTS, *1943 April, pp. 70-2 :*
Protection of buildings from lightning. Paper by Dr. H. J. Taylor, Prof. Physics, Wilson College, Bombay.

JNL., ROYAL SANITARY INSTITUTE, *1944 April, pp. 65-75 :*
Rodent infestation. Paper by W. M. Gracie, Director, Infestation Control, Ministry of Food.

A.R.P., WAR DAMAGE

ARCHITECTS' JOURNAL, *1944 June 15 ;*
COUNTRY LIFE, *June 2, pp. 942- :*
National Buildings Record. Report on Exhibition (Nat. Gallery), and (C.L. :) description of work by J. Summerson [*A.*], Deputy Director. (A.J. :) illusns., with chart of organisation of N.B.R.

ARCHITECTURAL REVIEW, *1944 June, pp. xlvii-viii, l :*
Bomb damage in Germany : note and alphabetical list of towns. War damage in Italy : note on Monte Cassino (with phots.), and the Allied Sub-Commission for Monuments, Fine Arts and Archives's statement on repairs.

ARCHITECT AND BUILDING NEWS, *1944 Apl. 28, pp. 61-3 ;*
ARCHL. ASSOCIATION JOURNAL, *May, pp. 78-82 :*
Architectural notes on a recent visit to Sicily ; by Eric L. Bird [*A.*].

ARCHITECTURAL REVIEW, *1944 April, pp. xliii-iv ; xliv-vi :*
War Office report on monuments of S. Italy. *Also* Pompeii war damage, 1943 : note and map by H. V. M. Roberts.

COUNTRY LIFE, *1944 July 14, pp. 72-3 :*
Historic buildings in Naples : an official account of the state of the Angevin churches on entry of the Allied armies. Illusd.

ARCHITECT AND BUILDING NEWS, *1944 June 2, p. 134 :*
War Office phots. of Tripoli (2).

TOPOGRAPHY

ARCHITECTURAL REVIEW, *1944 July, pp. 8-18 :*
Doré's "Babylon." Detailed critical article by Millicent Rose on Gustave Doré's illustrations of London life and scenes. Illusd.

COUNTRY LIFE, *1944 June 16, pp. 1030-3 :*
Mediæval Shrewsbury, drawn and described by E. Walker.

ARCHITECTURAL REVIEW, *1944 May, pp. 115-7 :*
The D. H. Lawrence country. Article by J. Burke on architecture and countryside of Eastwood, Nottingham.

TOWN AND COUNTRY PLANNING (generally)

JNL., AMERICAN INSTITUTE OF ARCHITECTS, *1944 Apl., pp. 176-82 :*
Frank Lloyd Wright, Mrs. Rosenman (Chairman, Natl. Ctte. on Housing), H. A. Nelson, of Natl. Assn. Real Estate Bds., and others in radio discussion on planning.

LIBRARY ASSOCIATION RECORD, *1944 April, pp. 61-2 :*
Town planning and the public library, by Miss H. M. Jennings, Public Libn., Malden and Coombe.

PENCIL POINTS, *1944 Mar., pp. 66-70 :*
Planning is politics . . . but . . . are planners politicians, by Catherine Bauer. A review of current English planning and planning literature.

PENCIL POINTS, *1944 May, pp. 60-4 :*
Education for planning : article by K. F. Wittmann, Asst. Prof. of Design, Architecture Dept., Pratt Inst. Illusd.

ARCHITECTS' JOURNAL, *1944 July 13, pp. 27-8 :*
Control of use of land : commentary on Uthwatt and Government White Paper on T. & C. planning.

NATIONAL PLANNING (specifically)

ARCHITECTS' JOURNAL, *1944 April 14, p. 277 :*
Public utilities and national planning : 1st article by Leslie Hardern. No. 32 in Physical planning series. Pt. 2, by L. B. Escritt : We must plan services within a national policy.

REGIONAL PLANNING

JOURNAL, TOWN PLANNING INSTITUTE, *1944 May-June, pp. 131-46 :*
Agriculture and planning. Paper by Dr. Dudley Stamp.

TOWN PLANNING AND RE-PLANNING

JNL., TOWN PLANNING INST., *1944 Mar.-April, pp. 105-9 :*
Planning—a lawyer's reflections, by D. Heap. Size of towns, period planning.

ARCHITECTURAL FORUM, *1944 Apl., pp. 133-40 :*
"An organic theory of city planning," by H. and E. M. J. Herrey and C. Pertzoff. Neighbourhood unit theory based largely on consideration of traffic routes. "Circumferential traffic" or "precinct" idea applied to central city and residential areas.

JNL., AMERICAN INST. OF ARCHITECTS, *1944 Mar., pp. 123-39 :*
Washington : a planned city in evolution. Paper by Maj.-Gen. Ulysses S. Grant. Illusd. plans.

JNL., ROYAL ARCHITECTURAL INSTITUTE OF CANADA, *1944 May, pp. 89-94 :*
Organisation for city planning : article by Lawrence M. Orton, Planning Commissioner N. York City. Status, operations, finance, etc., of city plg. agency. Bibliography.

ARCHITECT AND BUILDING NEWS, *1944 July 7, pp. 8-10 ; July 14 ; July 21 ;*
JOURNAL R.I.B.A., *August, pp. 247-52 :*
The surroundings of St. Paul's and a national memorial : paper to Ecclesiological Soc. by W. H. Ansell [*PP.*].

ARCHITECT AND BUILDING NEWS, *1944 May 5, pp. 70-3 ;*
ARCHITECTS' JOURNAL, *May 18, pp. 367-70 ;*
ARCHITECTU RAL DESIGN AND CONSTRUCTION, *May, p. 109 ;*
BUILDER, *May 12, pp. 376-7 ;*
BUILDING, *May, pp. 116-7 ;*
COUNTRY LIFE, *May 5, pp. 770-1 :*
London traffic planning : Royal Academy Planning Cttee's report on Road, rail and river communications and planning in London, abstracted or reviewed and illusd. Proposals for ring roads, cross-overs, &c.

ARCHITECT AND BUILDING NEWS, *1944 May 26, pp. 120-2 :*
Brentford, Middlesex. Redevelopment scheme by H. V. Lobb [*A.*]. Illusd. (Further reference.)

ARCHITECT AND BUILDING NEWS, *1944 May 5, pp. 76-9 ;*
ARCHITECTS' JOURNAL, *May 4, pp. 331-4 ;*
ARCHITECTURAL DESIGN AND CONSTRUCTION, *June ;*
BUILDER, *May 5, pp. 355-9 ;*
COUNTRY LIFE, *May 12, pp. 812-3 :*
Plymouth plan, by J. Paton Watson, City Engineer, and Prof. P. Abercrombie. Reviewed and illustrated.

BUILDER, *1944 June 9, pp. 460-1 ;*
BUILDING, *June, pp. 158-60 :*
Bristol, replanning of central area ; scheme by J. N. Meredith [*F.*], City Architect.

JNL., TOWN PLANNING INST., *1944 Mar.-April, pp. 102-4 :*
Planning progress in Manchester. Extracts from paper by R. Nicholas, including notes on Wythenshawe development.

BUILDER, *1944 June 16, pp. 481-2 :*
Sheffield replanning : design based on schemes prepared by city officials and Sheffield and S. Yorks Soc. Archts.

ENGINEERING NEWS-RECORD (N. York), *1944 Feb. 24, pp. 122-7 :*
City of N. York plans for peace. Article by I. V. A. Huie, Commr. Dept. Public Wks. Reference to proposed buildings.

JOURNAL, TOWN PLANNING INSTITUTE, *1944 May-June, pp. 152-3 :*
The future of the country town. Rept. of paper by G. L. Pepler.

BUILDER, *1944 May 19, p. 405 :*
Planning and industry : some obstacles to mobility. Report of paper to T. & C.P.A. by Prof. Sargant Florence.

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 July, p. 167 :*
Location of industry : notes on town and country planning issues raised by the Govt. White Paper on Employment, by F. J. Osborn.

ZONING

ARCHITECT AND BUILDING NEWS, *1944 June 23, pp. 179-81 :*
The Westminster precinct : article and map compiled by H. V. Molesworth Roberts, showing and dating buildings.

ARKHITEKTURA S.S.S.R. (Moscow), *1942 No. 1, pp. 17— :*
Settlements for establishments evacuated to Central Asia. Article by Academician Semenov, illustrating plans of community groups of bungalow houses.

ARKHITEKTURA S.S.S.R. (Moscow), *1942 No. 1, pp. 21— :*
Planning of rural settlements in the neighbourhood of main arterial roads. Article by V. Semenov.

ARCHITECTURAL FORUM, *1944 Apl., pp. 71-158 :*
" Planned neighbourhoods for 194x." Special No. on neighbourhood planning : schemes and projects illusd. and described in ten articles, incl. Objectives of neighbourhood plg., by T. B. Augur, of T.V.A. ; Prerequisites of planned development, by B. J. Houde, Administrator, Pittsburg Hg. Authority ; Rural activities centre for T.V.A., by Wank and Bianculli ; Uniform neighbourhood boundaries, by N. R. Deardoff ; Organic theory of city planning, by H. and E. M. J. Herrey and C. Pertzoff. Other projects and special building types referred to in separate entries.

ARCHITECTURAL FORUM, *1944 Apl., pp. 145-52 :*
Plan for Harlem, N. York, by Lescaze. Neighbourhood plg. on large scale of 356 acres worst N. York slum. Thirteen-storey flats (plans illusd. in detail), with community centres, schools and theatres on each block, one of which planned in detail. Site coverage 23 per cent. An important example of advanced planning technique applied to central city area.

SITE PLANNING

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 April, pp. 84-8 :*
Site lay-out technique for detached, semi-detached and terraced houses. By W. Segal. Detailed illusns.

AMERICAN CITY, *1944 Apl., pp. 51-2 :*
How gridiron street systems might be replanned. Proposal by W. S. Reynolds, F.W.A. Commissioner of Public Buildings. Illusd.

ARCHITECTURAL DESIGN AND CONSTRUCTION, *1944 June, pp. 136-7 :*
Building density. 1st of series on practical planning for estates by S. Gale ; includes useful table for calculation of building plot sizes.

TRANSPORT PLANNING

PENCIL POINTS, *1944 Apl., pp. 81-90 :*
Comprehensive planning for city : market and dwelling place. Part I : Traffic design. Detailed article by H. and E. M. J. Herrey of road design, road intersections, road efficiency calculation.

TRANSACTIONS, LIVERPOOL ENGINEERING SOCIETY, *1943, pp. 3-13 :*
Britain's need for roads. Paper by Boyd Bowman. Statistics of road use and development. Roads and planning.

AMERICAN CITY, *1944 Feb., pp. 52-3 :*
Street design for service. Chicago Plan Commission designs for major and residential streets, illusd. sections.

ARCHITECTS' JOURNAL, *1944 April 13, p. 276 :*
" Positive turn crossing," by A. G. Wise. A variant of the arterial flyover or clover crossing.

ENGINEERING NEWS-RECORD, *1944 Mar. 23, pp. 103-4 :*
Highway flyover for Los Angeles : complex four-level crossings.

ARCHITECTURAL FORUM, *1944 Apl., pp. 111-6, 119-24 :*
City replanning. Riverfront reconstruction, St. Louis, Missouri. Developt. of blighted area as park and office area ; with airport terminal for helicopter services linked with outer airfields. *Also* waterfront developt., Portland, Oregon ; central obsolescent area replanned by R. L. Morin, incs. recreation and educational centre.

GARDENS

JNL., TOWN PLANNING INST., *1944 Mar.-April, pp. 92-102 :*
Landscape and planning. Paper to T.P.I. by John Dower and discussion.

ARCHITECTURAL REVIEW, *1944 May :*
Landscape planning. Articles illustrating the integration of contemporary architectural practice with 18th-century landscape theory. " Lord Burlington's bijou or ' Sharawaggi ' at Chiswick," by H. F. Clark, and Cavalcanti House, Rio, by Niemeyer.

BUILDER, *1944 June 23, pp. 503-4 :*
London parks. Post-war improvements proposed by L.C.C. described and illusd.

ARCHITECTS' JOURNAL, *1944 April 6, pp. 259-62 :*
Leisure space in planning. [National Parks.] Article by John Bolland, No. 31 in Physical planning series.

Correspondence

THE GREEK DISCOVERY OF PERSPECTIVE

DEAR SIR,—In a note of mine inserted recently in the JOURNAL, I made a sincerely appreciative allusion to Miss Levy's paper on " The Greek Discovery of Perspective," published in the JOURNAL for January, 1943. May I now give expression to a grievance which I feel in regard to treatises of this kind in general. I am very far from underrating the mass of learning and the serious thinking that underlie Miss Levy's work, and I do not pretend to criticise her handling of the subject ; but assuming it is intended that architects should benefit by the research and study of leaders in thought on artistic subjects, the impressions of an average reader may not be without interest.

My grievance then, if I may call it such, is not against Miss Levy's paper only, but one or two passages in her treatise may serve to show what occasions my dissatisfaction. Briefly stated, this is what I have to say : Expressions are used which seem to imply penetrating precision of thought, but the ideas conveyed are nebulous in the extreme. In examining principles and analysing trends, this is unsatisfactory.

As an example—on page 52 at the bottom of column 2, I read : " The curvature of the field . . . was only rediscovered in the last century, with the single exception of the architect Schickhardt, who observed 300 years ago : ' No painter will believe that we see a straight line slightly curved.' " This seems to suggest that the enlightened know that we do see a straight line slightly curved. What does this mean ? Just before the sentence quoted, reference is made to the curved retina : and if the sentence merely means that no image on a curved retina can be straight, I should suppose that, as a geometrical proposition, everyone would agree ; but is the formation of an image on my retina what is meant by my seeing an object ? and must I perceive a line in the form which an independent observer concludes it would assume on my retina ?

We all know that the Greeks introduced curves into their buildings to correct the tendency of straight lines in certain situations to appear curved ; but this, I judge, is not at all what is referred to in the sentence quoted. If there were a vertical straight line (I mean, of course, a line that on scientific test would be pronounced straight) should I see it slightly curved ? and if so, in what way could it be bent so that it would look straight ? I begin to wonder whether I may not be told that I am outside the train of ideas which underlie Miss Levy's treatise. My reply would be that words and expressions are used which to me have definite meanings, but the combinations in which they are found in theses of this kind convey nothing to me at all.

On page 57 at the top of column 2 I read : " Cubism, in fact, by viewing objects from several points of view at once, introduced the time element into art, a few years after Einstein's definition of simultaneity and Minkowski's statement that time and space could only preserve their existence in union." Is it really held that cubist drawings suggest, embody, convey or express Einstein's ideas ? I wonder if Einstein would agree. Perhaps we are meant to understand that such drawings are the outcome of an association of ideas akin to, or identical with, those which led Einstein to formulate his doctrine. Again, would Einstein admit it ?

I am not mathematician enough to follow Einstein's theories in the form in which alone, I gather, they can be adequately expressed ; but, as far as I can make out, the modern physicist has abandoned the position taken up by Lord Kelvin when he said that he considered he understood a physical theory as soon as he was able (mentally at least) to construct a working model which showed its action. We cannot, so it seems, form any such model of the relativist's space-time continuum, which remains a conception expressible in mathematical language, but not otherwise. This is disappointing, but if it is true, we should be grateful if the painters could come to the rescue. I do not believe they can ; and furthermore, I deem such ideas altogether outside the realm of art. Perhaps that is where I am wrong ; but if so I need some much simpler and clearer instruction than we generally get on these subjects.

It will be obvious that this letter is an appeal for help.

Yours truly,

Redlands, 25, West Pinner Avenue, Pinner. JOHN H. MARKHAM [*F.*]

Notes

ARCHITECTURAL ASSOCIATION SCHOOL OF ARCHITECTURE

POST OF PRINCIPAL

Applications are invited for the Post of Principal to the A.A. School of Architecture.

Candidates should send full particulars of their qualifications and experience with illustrations of executed work, to the Secretary of the Architectural Association, 34/36 Bedford Square, London, W.C.1.

Candidates who are abroad may apply by cable giving names of persons who can act on their behalf in supplying the above particulars.

The last date for receipt of applications is 16 October 1944.

COUNCILLOR DOUGLAS WOOD NOMINATED MAYOR OF WESTMINSTER.

Councillor Douglas Wood [*F.*] has been nominated as Mayor of the City of Westminster for the forthcoming mayoral year. Mr. Wood has served on the City Council since 1932 and was chairman of the Housing Committee for three years. From 1919 to 1922 he was Housing Commissioner to the Ministry of Health. Mr. Wood has practised as a private architect in Westminster since 1904.

F.A.C. MAUNDER [*A.*] CITY PLANNING OFFICER AND RECONSTRUCTION ARCHITECT, PORTSMOUTH.

The Portsmouth City Council have decided to form a new Department for Planning and Reconstruction and have appointed Mr. F. A. C. Maunder as City Planning Officer and Reconstruction Architect.

Mr. Maunder was trained at the Durham University Schools of Architecture and Planning; he was awarded the Rome Scholarship in Architecture in 1934 and the Victory Scholarship in 1935.

He was appointed Deputy City Architect at Portsmouth in 1936, and latterly has been preparing plans for the post-war development of that city.

RETIREMENT OF MR. B. PRICE DAVIES [*F.*]

Mr. B. Price Davies has retired from the post of Borough Surveyor to Bangor after 25 years' service, being compelled to give up his appointment owing to ill-health.

THE ROYAL SANITARY INSTITUTE

NEW CHAIRMAN OF THE COUNCIL

Dr. James Ferguson, Medical Officer of Health, Surrey County Council, has been elected as Chairman of the Council of the Royal Sanitary Institute to take office on 1 October next.

Membership Lists

CESSATION OF MEMBERSHIP

Under the provisions of Bye-law 21 the following have ceased to be members of the R.I.B.A. :—

As Fellow

Raymond Turner Barker.

As Associates

John Raymond Bell.
Francis Holles Bulmer.
Owen Hanworth Cockrill.
Samuel Herbert Collins.
Charles McVeagh Crichton.
Charles Henry Dorman.
Reginald Latham Luke.
John Tenniswood Lupton.
Ieuan Gwynn Thomas.
Norman Ernest Godfrey Weston.

As Licentiates

Charles Button.
Frank Aloysius Coyle.
Arthur Charles Duggan.
William Gordon Galloway.
John Garvie.
Frederick George Nicholls.
William Orton.
Percy George Overall.
Reginald Price.
Frederic William Roberts.

Competitions

TERRACE HOUSING COMPETITION

NATIONAL HOUSING AND TOWN PLANNING COUNCIL

The National Housing and Town Planning Council invite architects and students of architecture to submit in competition designs for houses suitable for State-aided housing schemes in urban areas to be erected in terraces.

Assessor : Mr. Louis de Soissons, O.B.E., A.R.A. [*F.*].

Premiums : £125, £75, and a further £75 to be awarded at the discretion of the Assessor.

Last day for submitting designs : 12 October 1944.

No questions will be answered.

Conditions may be obtained on application to the Secretary, National Housing and Town Planning Council, 41, Russell Square, London, W.C.1.

ARCHITECTURAL COMPETITIONS ASSESSORS' AWARDS

All architects who take part in architectural competitions are reminded by the Council of the R.I.B.A. that participation in a competition is a definite acceptance of the principle that the award of the assessor is final and binding upon themselves as well as upon the promoters, and that any competitor who feels that he has real ground for dissatisfaction with an assessor's award should communicate with the Acting Secretary of the R.I.B.A.

Further, all architects, whether competitors or otherwise, are reminded that discussion or correspondence in the public or professional Press which tends to criticism or disparagement of an assessor or award cannot alter the final and binding effect of the award, but may prejudice architects and the whole competition system in the opinion of the public, and is, therefore, highly undesirable.

Notices

LIBRARY REFERENCE LISTS

Three large Reference lists on special building types have recently been prepared by the Library and copies are available to members and other readers. Owing to the difficulty of obtaining paper to duplicate large editions, the lists can normally be lent, only; though copies can be issued for the permanent files of research institutions, libraries and schools.

The lists are as follows :

TUBERCULOSIS SANATORIA. References to 8 books and 6 general articles on the subject and to about 80 sanatoria illustrated in British and foreign technical journals.

BUILDINGS FOR COMMUNITY AND SOCIAL CENTRES. This list was prepared in association with the National Council of Social Service and is the most complete reference list in existence to books and periodical articles on Community Centres, Youth Clubs, Village Halls and Village Colleges. It includes over 35 references to books and general articles and journal references to about 100 examples which have been built in 10 countries since 1927.

LABORATORIES AND RESEARCH STATIONS : general, academic, industrial and film. This list is of 119 references to books and articles and examples of laboratories and research stations in 15 countries.

MEMBERS' COLUMN

Member with wide experience, at present in the Army, wishes to contact another with a view to taking over an existing well-established practice or entering into a partnership with good post-war potentialities. Capital available.—Box No. 4944.

Associate with wide experience (provincial) could give accommodation help to busy practitioner.—J. C. HARVEY, Treetops, Broadhurst, Ashtead, Surrey.

Wanted to purchase, copy of *The Flat Book*, by J. L. Martin and S. Speight.—R. E. BURLEY, 40 Belvoir Street, Princes Avenue, Hull.

Member has office in City, near Monument, and would like to share it with another architect. Rent £45 inclusive.—Box No. 2484, c/o Secretary, R.I.B.A.

Member seeks active partnership in existing practice, preferably in the West Country, for after the War, and would welcome enquiries.—Box No. 2584, c/o Secretary, R.I.B.A.

WANTED.—A copy of Nathaniel Lloyd's *History of the English House*. State price and condition of volume.—M. E. TAYLOR [*A.*], County Hall, Newport, Mon.

Messrs. Keith Murray & C. S. White have as their temporary address : c/o Cameron & Middleton, 38 Bedford Square, W.C.1. (Tel. : Museum 1049.)

Mr. Eric Lyons [*L.*] and Mr. G. Paulson Townsend [*L.*] have resumed partnership and the practice is being carried on at Mill House, Bridge Road, East Molesey, Surrey, where they would be glad to receive trade catalogues.

Mr. Frank Reginald Steele [*F.*], F.S.I., A.M.T.P.I., Chief Assistant Architect to the City Architect of Bristol, has been appointed City Architect of Exeter in succession to Mr. John Bennett [*F.*], who is retiring. He will take up his new duties on 1 October.

Insulating existing buildings

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Ref. ARW/GS

9th August, 1944.,

The TenTest Fibre Board Co.Ltd.,
BARNET. HERTS.

Dear Sirs.,

You will recall that in October 1943 you carried out the work of lining the roof of our factory with ½" TenTest. A comparison between Winter conditions in the building before and since is interesting, and certainly seems to prove all that you claim as to the value of Insulation. The following facts speak for themselves:-

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4). During the first three months of 1944, we used 42% less fuel than over the same period of 1943.

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Yours faithfully,
For GRAMPIAN REPRODUCERS LTD.
Director.

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3. Better output
4. 42% fuel saved

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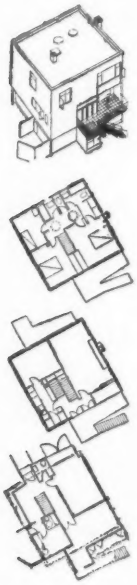
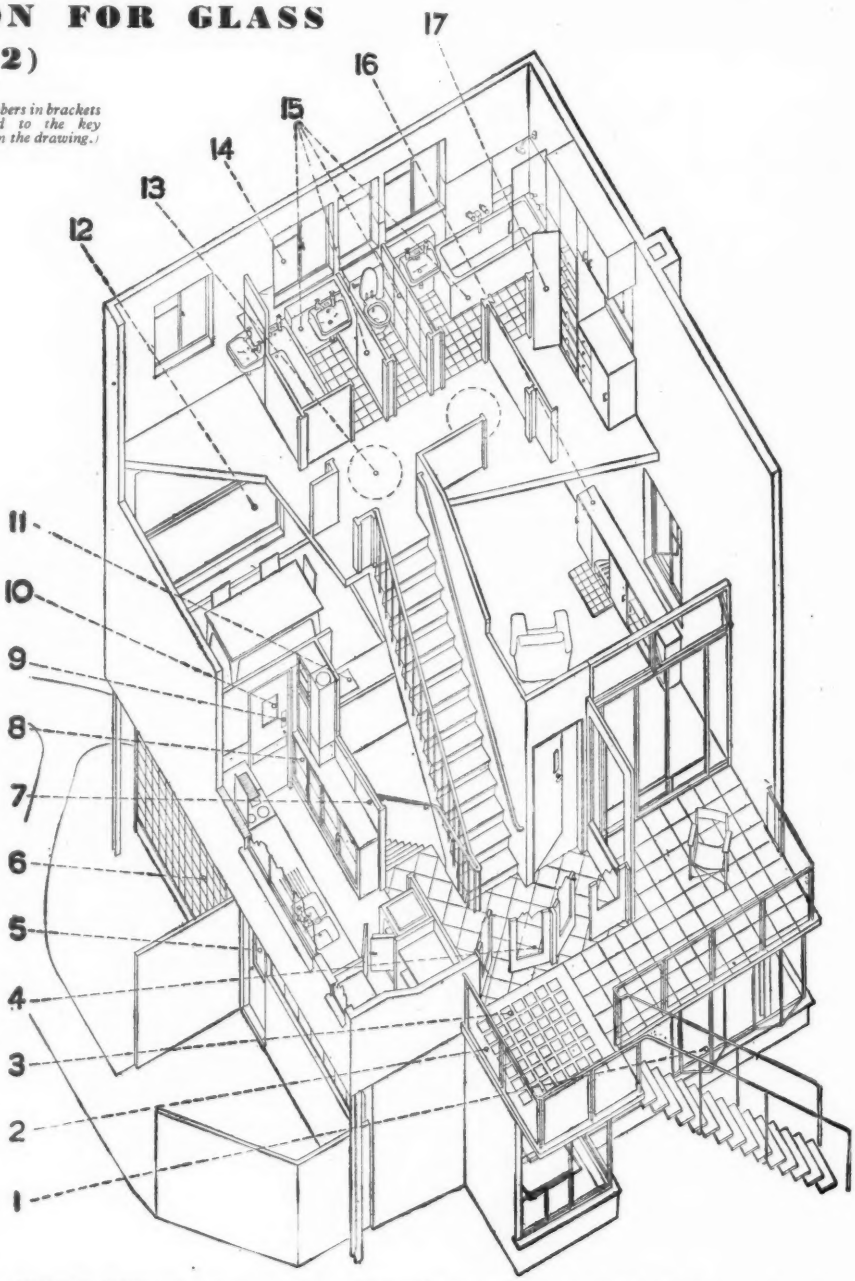
Telephone : BARnet 5501 (5 lines). *Telegrams :* "Fiboard, 'Phone, London."

SPECIFICATION FOR GLASS IN HOUSING (2)



(The numbers in brackets correspond to the key numbers in the drawing.)



SUN ROOM (1): Folding windows glazed with Clear Polished Plate Glass.

BALUSTRADE (2): Georgian Wired Cast Glass.

BALCONY (over sun room) (3): "ARMOURLIGHT" Toughened Lenses in reinforced concrete.

Doors (4): Clear Polished Plate Glass.

LAUNDRY *Door and Window* (5): Georgian Wired Cast.

HALL (6): Insulight Hollow Glass Brick panel wall.

KITCHEN *Walls* (7): "VITROLITE" to dado height.

Cupboard doors (8): 24 oz. Sheet Glass or Clouded Cathedral.

(9): Plate Glass fingerplates to doors.

Service door (10): Panel in Double Rolled Cathedral.

Cooker doors: "ARMOURPLATE."

Refrigerator shelves: Plate Glass.

Hotplate (11): "ARMOURPLATE."

DINING ROOM *Window* (12): ¼" Polished Plate Glass to vertical sliding sash window.

FURNITURE: ¼" Polished Plate Glass to tops throughout.

LANDING (13): Rough Cast Glass roof dome to light interior.

BATHROOM and W.C. *Windows* (14): Pinhead Morocco provides light with privacy.

Walls: "VITROLITE" in ashlar sizes for w.c. (15) "VITROLITE" panels to dado height for bathroom and for access panel in front of bathroom duct and bath panel.

BEDROOMS: "VITROLITE" splashbacks and Plate Glass shelves to washbasins.

LIVING ROOM (16): "ARMOURPLATE" top to mantelpiece.

DRESSING ROOM (17): Mirror to door and reverse side of cupboard door.

SILLS: "VITROLITE" in bedrooms, bathroom and kitchen.

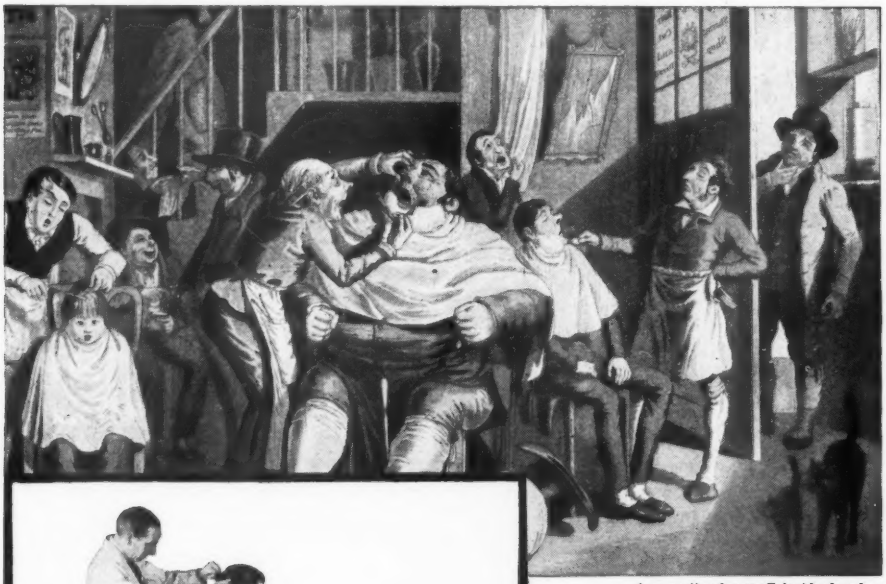
GARAGE DOORS and FRONT DOOR: Fire-resisting glazing: Georgian Wired Cast.

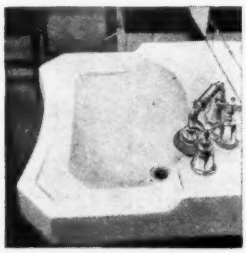
LARDER *Window*: Anti-fly Glass.

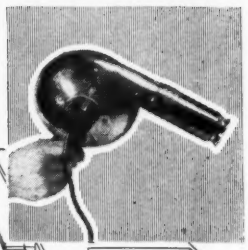
Insulation: Foam Glass or Fibreglass board.

Customer flow in the Twentieth-century Barber Shop

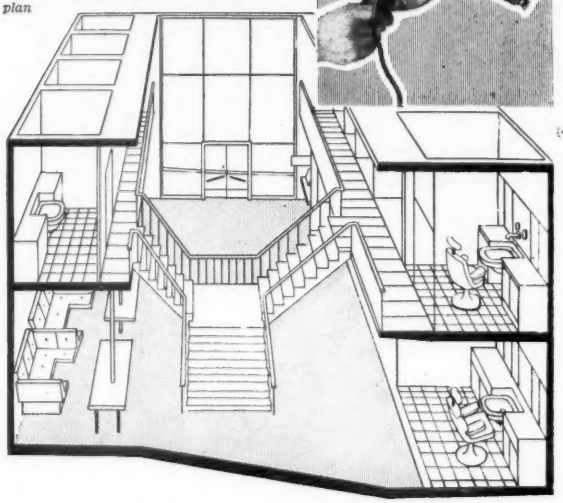
The problem of customer flow is more complicated in this department than in the rest of a store: in order to halt this flow for appreciable periods, and then once more to release it, special plans have to be made. Comfort and privacy must be assured, any feeling of hurry eliminated; and the whole department planned for smooth running. None of these considerations worried the early nineteenth-century barber.







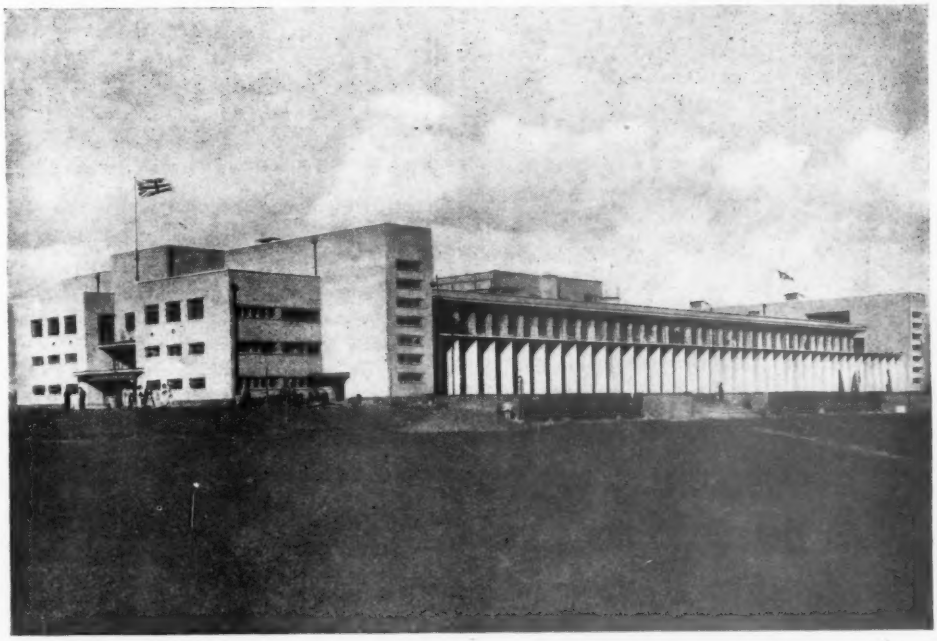
A suggestion for an efficient barber shop department, giving all the essential needs in a minimum of space combined with an orderly and smoothly working plan



WHAT THE BARBER WANTS Some degree of privacy for clients. Easily accessible storage for his implements. Up-to-date fittings. Concentrated and first-rate lighting. Convenient storage for customers' hats and coats. Well-planned traffic lanes IN and OUT of department. Facilities for sales display. Easily operated cash-desk system. Easily accessible and *visible* waiting-room.

WHAT MODERN METHODS CAN OFFER A working plan which provides comfort for both customer and client. An efficient layout. A feeling of restfulness for the client allied to swift working facilities. Smooth materials, which retain a permanently hygienic condition with the minimum of upkeep. Lighting which is restful to the eyes but provides the maximum degree of light necessary for good work. Air conditioning to maintain a comfortable and even temperature.

MODERN BUILDINGS



MODERN FACTORY

Architects: *Messrs. Henry Tanner, FF. R.I.B.A.*

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